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**SOIL EROSION AND AGRICULTURE IN THE
SOUTHERN PIEDMONT: A HISTORY**

by

Arthur R. Hall

Approved May 3, 1948

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A thesis

**submitted in partial fulfillment of the
requirements for the degree of Doctor
of Philosophy in the Graduate
School of Arts and Sciences
of
Duke University**

1948

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2. The second part of the chapter is devoted to a detailed discussion of the subject.
3. The third part of the chapter is devoted to a detailed discussion of the subject.
4. The fourth part of the chapter is devoted to a detailed discussion of the subject.
5. The fifth part of the chapter is devoted to a detailed discussion of the subject.
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9. The ninth part of the chapter is devoted to a detailed discussion of the subject.
10. The tenth part of the chapter is devoted to a detailed discussion of the subject.

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PREFACE

John Lawson, that salty gentleman of early eighteenth century Carolina, observed, regarding the Piedmont region of the colony, that "this Land ... is, in my Opinion, so durable that no Labor of Man in one or two Ages, could make it poor." In the two and one-half centuries since Lawson made his journey into the interior the labors of man have, as a matter of fact, made a large part of the Piedmont country poor.

I have attempted, in the present study, to tell the story of why and how the Southern Piedmont became one of the three or four regions in the nation most damaged by soil erosion. I found that it was necessary to write a fair portion of the agricultural history of the region, for the spread of soil erosion has been conditioned in varying degrees by the expansion or contraction of the cultivated area in response to the state of the market or other factors, the methods of cultivation used, the kinds of crops raised, the types of land tenure and agricultural credit, the stability of the farm population on the land, and the

individual or collective efforts made to combat soil waste. For similar reasons brief sketches of the soils and crop geography, the topography, and the climate of the region have been given. On the other hand, the reader should not look to these pages for a complete discussion of the agricultural history or geography of the Southern Piedmont, for I have tried to emphasize only the historical relationship between agricultural operations and soil erosion.

Soil erosion is not a phenomenon that can be isolated and studied by itself, without reference to the physical and human factors mentioned above. I have not been able to give a detailed account of the amount of land damaged by soil erosion at different periods. Historical discussions of soil washing are numerous for the Southern Piedmont, but they are usually in general terms. Reliance has been placed upon these, and upon indirect evidence, such as the amount of land in cultivation and the relative growth of population, to tell this part of the story.

It seemed to me that a study such as this would necessarily set present-day land-use problems of the region in their proper historical perspective. It seemed undesirable to fix definite date limits to the study. Except for the incorporation of statistical data from the 1940 and 1945 censuses, no attempt was made to discuss the period since 1930 in any detail. To do so would have involved an exposition of the work of the Soil Conservation Service, the Agricultural Adjustment Administration,

the Forest Service, the Farm Security Administration, and, in fact, the entire farm program of the New Deal, and would have expanded the present study beyond reasonable limits.

I became interested in the historical aspects of soil erosion in this region while employed in the Soil Conservation Service of the United States Department of Agriculture between 1935 and 1941. This project parallels closely the work that I was doing at that time. My former superiors in the Soil Conservation Service, Dr. C. W. Thornthwaite and Miss Lois Olson, gave encouragement and helpful criticism during the time I was under their supervision and have kept friendly eyes on the progress of the study since then. Dr. C. S. Sydnor has given wise counsel along the way, has read the manuscript, and has given the benefit of his wide experience in research and writing. Most men who engage in historical research are indebted to their wives for inspiration and assistance, and I am no exception. Martha H. Hall did most of the final laborious statistical work, typed the draft copy, and helped in numerous other ways. Mrs. Velma Heine of Washington, D. C. typed the final copy. Mr. Anthony J. Sucher, also of Washington, prepared most of the maps as they now appear in the manuscript. Acknowledgments are made of the assistance given by the many residents of the Southern Piedmont who furnished information or allowed me to inspect their family papers, by the staffs of the libraries where materials were used, and by the federal, state, and county officials consulted.

Arthur R. Hall
Alexandria, Virginia
April 1948

the service, the Department of Administration, and in
the Department of the Army, and would have
the present state of affairs reasonable limits.

It was not on while engaged in the Conservation Service
at the National Bureau of Investigation, and the
1937. This project benefited closely the work that I was doing
at that time. It formed suggestions in the field of conservation and develop-
ment, and the Department of the Interior, gave encourage-
ment and helpful criticism during the time I was under their
administration and have kept friendly eyes on the progress of the
project since then. It is a project that I have been proud to
see, has read the manuscript, and has given the benefit of
his own experience in research and writing. Most men who engage
in historical research are limited to their vision for inspira-
tion and motivation, and I am sure that the project will be
one of the final historical statistical work, typed the draft
work, and helped in numerous other ways. Mrs. Verna Helms of
Washington, D. C. was the first to read the manuscript and
was of assistance, proposed most of the work as they now appear
in the manuscript. Acknowledgments are made of the assistance
given by the many residents of the Southern District and their
kind invitation or allowed me to inspect their family papers,
as the project in the Department of the Interior was started, and in
the general, state, and county files are consulted.

SOIL EROSION AND AGRICULTURE IN THE SOUTHERN PIEDMONT: A HISTORY

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Chapter I

THE NATURAL SETTING

Summary

When first viewed by the white man, the Southern Piedmont was covered with an almost unbroken, parklike forest. Between the trees and in the forest openings there was a luxuriant growth of shrubs, vines, and other succulent plants. It appeared to be a very rich land. Physical factors peculiar to the region nevertheless caused soil erosion to occur at an ever-increasing rate when the native vegetation cover was removed. No matter how careful the individual farmer, or how enlightened the farming system, the chances for severe erosion in the Southern Piedmont are great compared with those in many other parts of the eastern United States.

Geologic erosion has lowered and rounded the surface, leaving the terrain in "maturity" in the geologic sense, but since most of the surface is sloping and the streams flow in comparatively

CHAPTER I

THE HISTORY OF THE

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When first viewed by the white man, the Southern States

was a vast and almost unbroken, fertile forest. Between

the trees and in the forest openings there was a luxuriant

growth of various vines, and other succulent plants. It appeared

to be a very rich land. (Savannah) Forests covered the land

and the great forest caused soil erosion to occur at an ever-increasing

rate from the center towards the coast. The soil

was fertile, the individual farmer, or how cultivated the forest

the system, the forest was a source of food and shelter for

and the great compared with those in many other parts of the

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deep valleys, there is much work for running water to do before the land is reduced to its lowest possible level. The soils are low in organic matter and natural fertility, making it difficult to reestablish vegetation once the natural cover has been stripped off and erosion started. Soft, rotten rock incapable of withstanding deep gullying underlies much of the region. The total amount of rainfall is high and the frequency of intense storms gives the water a maximum amount of cutting power. Mild winters lacking in snowfall but accompanied by rain and variations between freezing and thawing cause soil erosion to continue throughout the year.

The Southern Piedmont was, at the time of settlement covered by a forest of which oak, pine, and hickory were the principal upland constituents. There was an understorey of dogwood, persimmon, and grapevine. The forest stand was open on the uplands, and there were savannas where very few trees of any kind were to be found. Cane and smaller grasses, and various leguminous plants were most abundant in the lowlands, but the openness of the forest and the mellowness of the soil permitted their growth even on the uplands. The vegetal and soil blanket was unbroken save at the banks of streams, on steep slopes, in areas of rock outcrop, along animal and Indian trails, or where a recent violent disturbance had occurred. Such violent disturbances of the plant cover might be caused by windstorms, attacks of pests or disease, or severe burning, and might have given rise to a limited amount of accelerated erosion until vegetation was sufficiently reestablished. Nevertheless such accelerated erosion as may have taken place was

[illegible]

so limited in extent that it failed to attract the attention of explorers. *... were*

Indian settlement and Indian agriculture was confined to the proximity of the streams. The aboriginal husbandry was extensive in nature, causing a gradual decline in yields followed by the abandonment of the old field in favor of a newly cleared one. "Soil exhaustion" was accordingly a problem in Indian agriculture, but because most of the fields were on or near low grounds exhaustion did not ordinarily take the form of accelerated erosion. Indian fields, both abandoned and inhabited, constituted a large portion of the unforested area in the Piedmont at the time white settlement began.

Physical Factors

Extending from the vicinity of Richmond, Va., southwest for 600 miles to east central Alabama, and having an average width of about 100 miles, is the region called in this study the Southern Piedmont.¹ Its igneous and metamorphic rocks distinguish it from the sedimentary Coastal Plain to the east and south, and its lower elevation and less rugged surface differentiate it from the Blue Ridge physiographic province to the west

1. The Southern Piedmont as here defined is roughly co-extensive with the Piedmont soils of the red and yellow soils region on the north, northwest, and southeast, but areas of Piedmont soil at low elevations within the Blue Ridge region are not included. The Alabama extension of the region is omitted from this study. County boundaries are followed in order that use may be made of governmental statistics.

and north. The physiographic province called the Piedmont extends on northeast of Richmond, but here climatic differences cause a gradual transition from the red and yellow soils typical of the South to the darker colored soils characteristic of the Northeast. Cultural factors--the type of agriculture--also change to the northeast of Richmond.

The region, which today is in a critical state because of soil erosion, is the remnant of a very ancient continental mass that was buried under an accumulation of sediment. Later stream action and gradual uplift combined to strip off this accumulation, expose the old surface once more, and in turn carve it deeply. The principal streams and their main tributaries are rather deeply entrenched, having comparatively narrow flood plains and terraces, but steep-sided valleys. The largest areas of level land are on the interfluvial divides away from the principal streams, but even here the topography is rolling rather than flat.

As a result of the dissection that has taken place, most of the surface has some percentage of slope, and a great deal of the surface has slopes too steep for continued cultivation to row crops. To cite two examples, in the watershed of Lloyd Shoals Reservoir, an area of 1,414 square miles southeast of Atlanta, Ga., on the headwaters of the Ocmulgee River, 72.3 percent of the land is on slopes of 3 to 12 percent, that is, slopes too steep to cultivate without erosion control measures. Slopes of 12 percent or more, that is, slopes too steep for row crops under any circumstances, make up 18.6 percent of the entire area. The other 9.1 percent of the area is on slopes that could be

cultivated without intensive erosion control measures, and is to be found on the narrow flood plains and terraces (second bottom) of the streams.² In the Lake Michie watershed, 168 square miles near Durham, N. C. on the Flat River, the percentages of land on these same slope classes are respectively 77.8, 8.9, and 13.3.³ Here and there throughout the region are found monadnocks, composed of more resistant materials than the surrounding country, rising 100 feet or more above the general level. These are generally dignified by the name "mountain"--Little Mountain, King's Mountain, etc. Throughout the greatest extent, however, the interfluvial ridges rise to the same level and there are few irregularities in the line of the horizon. In short, the country looks level enough to encourage cultivation on the uplands, yet is sloping enough to cause soil erosion when cultivation is attempted.

From the standpoint of soil formation and agriculture the rock materials of the Southern Piedmont may be divided into the groups listed below. The order indicates roughly the comparative areal extent of each group. (1) Granite, granite gneiss, and schist--light colored rocks high in feldspar and mica. The principal soil series derived from these rocks are the Cecil,

2.P. H. Montgomery, Erosion and Related Land Use Conditions on the Lloyd Shoals Reservoir Watershed, Georgia (Washington, 1940).

3.Irving L. Martin and Turner C. Bass, Erosion and Related Land Use Conditions on the Lake Michie Watershed, near Durham, N. C. (Washington, 1940).

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Durham, Appling, Worsham, Louisa, and Madison. (2) Slate and volcanic rocks, from which are derived the Georgeville, Orange, Alamance, and Herndon series. (3) Diorite, diabase, hornblendite, and mafic gneiss, dark colored rocks having a high content of iron minerals. From these rocks come the Davidson, Mecklenburg, and Iredell series of soils. (4) Triassic sandstone and shale, remnants of the sedimentary mantle that once covered the region. The White Store, Wadesboro, Penn, and Granville series are the principal soils of these rocks. (See map No. 1) In many localities the various rock types are intricately mixed, giving rise to other soil series, the two principal ones being Wilkes and Helena.⁴ The slate belt (Number 2 of the above list) is located in the eastern Piedmont of the Carolinas, with extensions north into Virginia and southwest into Georgia. The largest area of Triassic soils and rocks is in Orange, Durham, Wake, Chatham, and Moore Counties, North Carolina, but there are other smaller areas in that State and Virginia. The rock types and resulting soils of groups (1) and (3) of the above list are found intermingled throughout the remainder of the region.

The rocks of group (1), because of their high content of feldspar disintegrate to depths of 50 to 100 feet under the climatic conditions of the region. Cecil, Appling, Madison, and related soils are accordingly underlain by material that is very

⁴H. A. Ireland, C. F. S. Sharpe, and D. H. Eargle, Principles of Gully Erosion in the Piedmont of South Carolina. United States Department of Agriculture Tech.Bul. No. 633 (Washington, 1939), p. 19.

friable and offers no resistance to erosion once the sandy and and clayey layers above it have been removed by running water. U-shaped gullies of great depth occur in these soils. On the other hand, the remaining rock types are more resistant to weathering. Bedrock in areas of these types is to be found within a few feet of the surface, where it imposes a barrier against deep gullying. The resistant nature of the rocks of the North Carolina slate belt is reflected in the topography. There is probably more rugged land in this locality in proportion to area than in any other section of the Southern Piedmont.

The erosiveness of soils is of course closely related to environmental factors such as slopes, amount and distribution of rainfall, variations in temperature, amount of freezing and thawing, and vegetative cover. These factors not only influence directly the amount of erosion that takes place; they also have an indirect influence through their part in determining the character of the soil. Nevertheless there are characteristics influencing erosion that are inherent in the soil texture and structure (the size of soil particles and the way they are grouped) that are related more to the underlying parent material of the soil than to the above mentioned factors. Sandy or loamy topsoils underlain by friable sandy clay subsoils of considerable depth absorb the water instead of allowing it to run off on the surface. Clay loam or clay topsoils underlain by tight clay subsoils have very little absorptive capacity; the water accumulates on or near the surface and running off, carries the soil

the soil. The soil is of great depth in these soils. On the other hand, the remaining rock types are more resistant to weathering. Hence in areas of these types it is to be found with a thin layer of the surface, where it shows a brownish yellow color. The resistant nature of the rocks of the North American plate belt is reflected in the topography. There is a marked difference in the topography in relation to the weathering of rocks is of course closely related to the weathering factors such as those, amount and distribution of rainfall, variations in temperature, amount of freezing, and the amount of erosion that takes place; they also have an influence on the amount of erosion that takes place; they also have an influence through their part in determining the character of the soil. Nevertheless there are characteristic differences in erosion that are inherent in the soil texture and structure (the size of soil particles and the way they are grouped) and the amount of erosion that takes place. Sandy or loamy topsoils are to the above mentioned factors. Sandy or loamy topsoils are characterized by large sandy clay subsoils of considerable depth. The water content of the soil is an important factor in the weathering of the soil. The soil is of great depth in these soils. On the other hand, the remaining rock types are more resistant to weathering. Hence in areas of these types it is to be found with a thin layer of the surface, where it shows a brownish yellow color. The resistant nature of the rocks of the North American plate belt is reflected in the topography. There is a marked difference in the topography in relation to the weathering of rocks is of course closely related to the weathering factors such as those, amount and distribution of rainfall, variations in temperature, amount of freezing, and the amount of erosion that takes place; they also have an influence on the amount of erosion that takes place; they also have an influence through their part in determining the character of the soil. Nevertheless there are characteristic differences in erosion that are inherent in the soil texture and structure (the size of soil particles and the way they are grouped) and the amount of erosion that takes place. Sandy or loamy topsoils are to the above mentioned factors. Sandy or loamy topsoils are characterized by large sandy clay subsoils of considerable depth. The water content of the soil is an important factor in the weathering of the soil.

with it. As the remaining clay particles dry out they form a crust over the surface, thus preventing still further the absorption of water. A light sandy topsoil underlain by tight impervious clay also has very limited absorption capacity and is subject to severe erosion.

It is impossible to classify the soil series of the Southern Piedmont according to erosiveness, or to set geographic limits on the basis of erosiveness per se, because of the wide range of texture found in each series and because there are so many different combinations of texture, parent material, slope, and vegetative cover. A classification made for the Lloyd ^hSoals watershed based largely on texture may serve as an indication of conditions in the region. The following classes of soils were distinguished: (1) soils subject to severe and very severe erosion, 47 percent of the watershed area; (2) soils subject to moderate and moderate to severe erosion, 43 percent of the area; (3) soils subject to slight erosion or subject to deposition, 10 percent of the area. The last classification consists mainly of stream bottom and stream terrace soils.⁵

The soils of the Southern Piedmont were developed under a forest cover, a condition that permitted the incorporation of vegetable humus mainly in the first inch or less of topsoil, in contrast with grassland soils where the continuous root mass supplied organic matter for a foot or more in depth. High annual rainfall, high temperatures, and comparatively "open" winters

5. Montgomery, op. cit., pp. 13-15.

favored continuous leaching in the Southern Piedmont. The result was the development of soils that were low in organic matter and relatively deficient in the three principal plant foods--nitrogen, phosphorus, and potash. Measurements indicate that the red and yellow soils region has an average of 4,000 pounds of nitrogen per acre to a depth of 40 inches under natural conditions, compared with 6,700 pounds for the brown forest soils region (most of the Northeastern States and the Ohio Valley), and 16,000 pounds for the prairie soils and blackearth regions (portions of Illinois, Missouri, Minnesota, and Iowa, and the eastern section of the tier of States from North Dakota south through Texas).⁶ In general, the same relationship exists among the soils regions in respect to phosphorous.⁷ One-half of the potassium for fertilizer consumed in the United States in 1937 was used in the southern States, North Carolina, Georgia, South Carolina, and Virginia ranking first, third, fourth, and seventh, respectively in amount used.⁸ Within the red and yellow soils region, the Piedmont soils contain slightly greater average amounts of phosphorus and potash than do Coastal Plain soils, but about the same amounts of nitrogen. They contain smaller amounts of all three constituents than do the soils of the Southern

6. Oswald Schreiner and B. E. Brown, "Soil Nitrogen," in Soils and Men, Yearbook of Agriculture, 1938 (Washington, 1938), p. 365.

7. W. H. Pierre, "Phosphorus Deficiency and Soil Fertility," in ibid., p. 381.

8. H. P. Cooper, Oswald Schreiner, and B. E. Brown, "Soil Potassium in Relation to Soil Fertility," in ibid., p. 401.

mountain regions.⁹ It may be said that in average fertility the Southern Piedmont soils are about on a par with other soils of the Southern States, but compared with the soils of the remaining portion of the eastern half of the United States they are poor.

Precipitation in the Southeast usually originates in masses of warm air heavily laden with moisture from the Gulf of Mexico and the tropical Atlantic. Contact with colder air masses from the northwest in the neighborhood of the Appalachians, as well as the direct orographic influence of the mountains, causes greater annual precipitation in the mountains and a zone 50 miles more or less in width to the east and south in Georgia and the Carolinas than occurs in the remainder of the Piedmont. The amounts range from 80 inches in the Blue Ridge to 50 inches at the outer edge of the zone. The remainder of the Piedmont receives from 40 to 50 inches of rainfall annually. This is slightly less than the amount received over most of Alabama, Mississippi, and Louisiana, but more than that received by the major portion of the northeastern States and the Ohio Valley.¹⁰

Late summer is the season in which most precipitation occurs. The dryest season is late fall, and there is a secondary dry

9.C. B. Williams, W. B. Cobb, and H. B. Mann, Agricultural Classification and Evaluation of North Carolina Soils, North Carolina Agricultural Experiment Station, Bul. No. 293 (Raleigh, 1934), p. 102.

10.J. B. Kincer, "Precipitation and Humidity," in Atlas of American Agriculture, Physical Basis, Including Land Relief, Climate, Soils, and Natural Vegetation of the United States (Washington, 1936), pp. 6-7, 14-15.

the presence of the eastern half of the United States they are

Investigation in the Northwest during the summer of 1934
showed that the heavily forested area from the Gulf of Mexico
to the tropical Atlantic, contrast with other areas from
the Northwest in the neighborhood of the Amazon basin, as well

in the West, orographic influence of the mountains, causes
relative humidity precipitation in the mountains and a zone of high
humidity in which to the east and south in the lowlands and the
Caribbean Sea zone in the mountains of the mountains.

Loss than the amount received over most of Alabama.

The latest season is late fall, and there is a secondary or

spell in the late spring. The rainfall is fairly well distributed in relation to seed time, growing season, and harvest of warm season crops, but the summer maximum comes when fields are kept in clean tilth, that is, when they offer the least resistance to erosion. Climatologists, comparing the amount and variation from year to year of precipitation in the Southeast with that of the semiarid and arid regions of the country, consider the former to have an adequate rainfall for growing crops at all times. Nevertheless, with the methods of cultivation prevalent down to the late nineteenth or early twentieth century there was always a possibility that drouth would cause partial or complete crop failure.

Of as great importance for soil conservation as the annual and seasonal precipitation is the kind and intensity of rainstorms. Even the most casual observer of the weather knows that in the eastern United States, especially the Southeast, winter precipitation occurs at a uniform rate over comparatively long periods, whereas summer is marked by short periods of intense rainfall known as thunderstorms. Water from uniform rains soaks into the ground and finds its way to the streams gradually so that surface run-off and sheet erosion is held at a minimum, but the slow soaking due to uniform rains causes the entire soil body to be lubricated and to go down hill by the process of mass movement. This process occurs in the Southeast but it is not so apparent nor so important as in the northern parts of the United States. The condition causing steady winter rains to be harmful in the Southeast is the lack of either a sufficient vegetative

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...in the winter is the fact of almost a uniform vegetation

cover or sufficient blanket of snow and ice to protect the soil. Winter is also the season when the U-shaped gullies in the areas underlain by granite and granite-gneiss in the Piedmont are most active. The steady rains soak the rotten disintegrated rock underlying the soil in the walls of the gully, causing the walls to cave in. The debris is left in the bottom of the gully to be flushed out by the intense thundershowers of the next warm season.

The erosion damage caused by one short thunderstorm may exceed that of a long period of steady rain because the rain falls faster than the earth can absorb it, there is surface run-off and flooding of natural and artificial drainageways, causing sheet washing and shallow gullying. In planning erosion control measures the farmer and soil conservation technician accordingly are concerned less with the total annual rainfall than with the greatest amount likely to fall in a short period. If they underestimate the latter factor productive fields and expensive terrace systems may be ruined in a few hours of hard rain. In the Southeast the high summer insolation combines with the great amount of moisture carried by the atmosphere to cause more frequent and more intense thunderstorms than in other sections. Frequent invasions of the region by tropical cyclones in the spring and fall also cause short, violent rainstorms. These tropical storms soon lose their hurricane force after passing inland, but the disturbance they cause in the atmosphere is sufficient to produce intense rainfall. Thus, in Spartanburg, S. C. in August and September, 1888 there was a total of 35.7 inches

of rain, most of which fell in two weeks time. This was more than the rainfall for the entire year in either 1925 or 1930. The excessive precipitation was caused apparently by two tropical cyclones that passed through the region.¹¹ The intensity of rainstorms and the frequency of their occurrence decrease from the Gulf and south Atlantic coast northward. Within the Piedmont storms are more intense and more frequent near the mountains than elsewhere, their distribution being similar to that of annual rainfall.¹²

The Southern Piedmont has a long frost-free season and mild, open winters. The northern limit of the area having a two hundred-day growing season (frost-free season) extends roughly in a northeast-southwest direction some distance west of Norfolk, Va., Raleigh, N. C., Clemson College, S. C., and Rome, Ga., setting the approximate upper boundary of profitable cotton production.¹³ Most of the Southern Piedmont is covered with snow an average of less than 10 days out of every year. It is possible to produce cold-season crops of small grains, turnips, and legumes, and livestock industries are favored by the mild winter. Counterbalancing these advantages are certain disadvantages. In more

11. Ireland, Sharpe, and Eargle, op. cit., pp. 9-10.

12. David I. Blumenstock, Rainfall Characteristics as Related to Soil Erosion, U.S.D.A. Tech. Bul. no. 698 (Washington, 1939), pp. 13-18, 26; Stephen S. Visser, "Torrential Rains as a Serious Handicap in the South," Geographical Review, v. 31 (Oct. 1941), pp. 644-652.

13. William Gardner Reed, "Frost and Growing Season," in Atlas of American Agriculture, pp. 38-39.

of this sort of thing fell in two or three. This was more

than the rainfall for the entire year in either 1888 or 1889.

The monthly rainfall in the winter months is as follows:

and continues that rainfall is about the same.

There is no regularity in the rainfall of this season.

The Gulf and south Atlantic coast northward. Within the field-

and crops are more intense and more frequent near the mountains

than elsewhere, their distribution being similar to that of an-

ual rainfall.

The Southern Piedmont has a long frost-free season and mild,

even climate. The northern limit of the area having a two hun-

dra-day growing season (frost-free season) extends nearly in a

westward-southward direction some distance west of Norfolk, Va.,

about 200 miles.

The approximate upper boundary of profitable cotton production

lies at the Southern Piedmont is covered with snow an average of

less than 10 days out of every year. It is possible to produce

rich-season crops of small grains, fruit, and legumes, and live-

stock pastures are favored by the mild winter. Corn and rice

are also produced in this section.

and other conditions are similar to those of the

the

11. Climate, Soils, and Rainfall. pp. 2-11.

12. Vegetation. pp. 12-13.

13. Animals. pp. 14-15.

14. Mineral Resources. pp. 16-17.

15. Population. pp. 18-19.

16. Index. pp. 20-21.

northerly climates the soil is given a respite from erosive influences during the weeks or months that it is frozen and covered with snow. No such respite occurs in most of the Southeast, where the ground is exposed to running water practically all winter.

There are, nevertheless, diurnal alterations between freezing and thawing, causing erosion by frost heave. Frost heave has played an important part in sculpturing the landscape in cold climates. There are reasons to believe that in the Southern Piedmont, under the conditions immediately preceding settlement, its importance was negligible, but studies by the Soil Conservation Service indicate that at the present time it is quite active in winter in the first few inches of the soil. On bare slopes it produces an effect akin to that of sheet erosion by water.

The Original Forest

Most of the conditions favorable to accelerated soil erosion mentioned above were present only as potentials in the time immediately before settlement. A balance of power had been reached among the various forces of nature. It was a rather delicate balance--one that was being strained even before the arrival of the white man--but it existed nevertheless. The visible semblance of this balance was the blanket of vegetation that covered the Southern Piedmont. The first Europeans to view the country could not know the destructive forces hidden and held in check by the vegetative blanket, nor were they fully aware of the

entirely alluvial. The soil is given a regular frost covering in-
 creases during the weeks or months that it is frozen and covered
 with snow. No such fissure occurs in most of the Southwest,
 where the ground is exposed to running water practically all winter.
 The soil, nevertheless, is much elevated between the
 and the river, causing erosion by frost heave. Frost heave has
 been an important part in separating the land from the
 alluvium. There are reasons to believe that in the Southwest
 the importance was negligible, but studies by the Soil Conserva-
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 importance in the first few inches of the soil. On some slopes
 it causes an actual movement of soil in some cases.

The Original Forest

At the time the conditions favorable to accelerated soil erosion
 existed above were present only as potentialities in the land.
 The various forests of nature. It was a rather delicate
 balance that was being maintained even before the arrival of
 the white man--but it existed nevertheless. The white man
 came to this country in the form of the first European to visit the country
 and he brought with him destructive forces hidden and held in check by
 the forest. The forest, not were they fully aware of the

consequences that would follow its removal or alteration. On the contrary, this covering was very attractive, and made the region appear as a very desirable place indeed, especially when compared with the sandy pine barrens or disease-ridden swamps of the Coastal Plain.

In 1565 and 1566 Juan Pardo led two expeditions from the Spanish post of Santa Elena on the South Carolina coast across the Piedmont into the Blue Ridge. He declared that the interior above the Coastal Plain was "muy buena tierra."¹⁵ John Fontaine, after riding across the region to the Shenandoah Valley with Governor Alexander Spotswood of Virginia in 1716 wrote that, "I saw there the largest timber, the finest and deepest mould, and the best grass that I ever did see."¹⁶ John Lawson, surveyor general of North Carolina, was even more explicit. At the turn of the eighteenth century, when settlements extended only a few miles inland from the seaboard, he wrote as follows:

...this Land, [in the Carolina Piedmont] is, in my Opinion, so durable that no Labor of Man in one or two Ages, could make it poor... The Savages do indeed, still possess the Flower of Carolina, the English enjoying only the Fag-end of that fine country.¹⁷

15. Juan Pardo, "Relación," in Eugenio Rudíaz y Caravía, La Florida, su conquista y colonización por Pedro Menéndez de Aviles (Madrid, 1894), v. 2, pp. 466-468; Joan de la Vandra, "Relación," in ibid., v. 2, pp. 481-486; English text of the latter in "Pardo's Exploration of South Carolina and Georgia" [edited by J. G. Shea], Historical Magazine, v. 4 (Aug. 1860), pp. 230-232.

16. John Fontaine, "Journal," in Memoirs of a Huguenot Family: Translated and Compiled from the Original Autobiography of the Rev. James Fontaine, edited by Ann Maury (New York, 1853), p. 285.

17. John Lawson, Lawson's History of North Carolina [reprint of the edition of London, 1714] (Richmond, Va., 1937), pp. 36, 54.

Such statements were not mere reflections of a real-estate-boom psychology. They were based upon the quantity of game, the agricultural products and other vegetable food secured by the Indians, and the amount and kind of timber and succulent plants.

The native forest type dominant in the region was oak-pine. An examination of the original survey plats for grants covering 8,768 acres in Fairfield County, South Carolina, laid out between 1755 and 1789 indicate that the trees used for boundary markers included 215 of various species of oaks, 105 pines, 97 hickories, and 37 trees of other kinds. (See Appendix No. I) Few of these plats lay entirely on the interstream divides. Possibly if more plats could be found covering the divides, a larger proportion of pines would be included.

According to various eighteenth century observers this high percentage of pine was typical of some areas in the Piedmont but not at all typical of others. It has been assumed by ecologists that pine was to be found mainly on the driest upland sites or where some disturbance, such as burning, had occurred. If this assumption were correct the distribution of pine in the pre-settlement forest would give some indication of the extent to which the forest had been disturbed. However, the early writings do not entirely confirm the assumption.

In 1705, at the time pioneers were beginning to advance from the Tidewater into the Piedmont of Virginia, Robert Beverly indicated that in that colony pine was confined mostly to the coastal areas, but that it was on the increase due to clearing and

There is no evidence that pine existed along the interior section of the Virginia-North Carolina boundary in the early eighteenth century. The party that surveyed the line in 1728 recorded pines as marker trees only in the vicinity of the Dismal Swamp and the coast.¹⁹ This is amply confirmed by William Byrd's superb Histories of the Dividing Line Betwixt Virginia and North Carolina. Byrd was a close observer of the vegetation. He noticed pines growing in the sandy soil in the Coastal Plain, but makes no allusion to them in the Piedmont. Here the absence of pine trees could not be ascribed to lack of fire, for Byrd noticed several "Poison'd Fields," where no tree larger than a sappling grew; he thought that these had been caused either by fire or by caterpillars. One such place near the western end of the dividing line, on the northern border of the modern Stokes County, N.C., supported a locust thicket interlaced with briars and grape vines. This denuded area was 2 miles in width. In another area disturbed in similar manner in the northeast corner of the present Rockingham County, N.C., there was a thick growth of oak, hickory and locust saplings.²⁰ In general, the woods observed by Byrd in the Piedmont section consisted of hazel nut, sugar tree (maple?), beech

18.[Robert Beverly], The History and Present State of Virginia, in Four Parts, by a Native and Inhabitant of the Place (London, 1705), Bk. 2, pp. 7-8, 16-19, 21-28.

19.Alexr. Irvine, "Journal," in The Colonial Records of North Carolina, edited by William L. Saunders (Raleigh, 1886-1890), v. 2, pp. 799-815.

20.William Byrd, Histories of the Dividing Line Betwixt Virginia and North Carolina, edited by William K. Boyd (Raleigh, 1929), pp. 160, 210-212, 228, 231-232. Hereafter cited as Byrd, Histories.

and hickory having "a very rough bark" (shag bark hickory?) on the bottomlands and walnut, poplar (yellow poplar?), white oak, and hickory on the uplands. From the Dan River westward large numbers of chestnut trees were observed.

John Lawson's expedition in 1701 started at Charleston, S.C., made a wide swing into the Piedmont, and returned to the coast on the Pamlico River in North Carolina. Traveling from west to east, he arrived near the site of Durham, N. C., where he noticed a "prodigious overgrown Pine-Tree", the first he had seen for about 125 miles. Farther east he found more pines as he entered the Coastal Plain.²¹

Governor Arthur Dobbs of North Carolina went inland from Newbern to the Catawba River in 1755 to establish frontier garrisons and see some tracts of land that he had secured. Apparently his route coincided with Lawson's for some distance near the Yadkin River, both men following the Indian trading path that crossed the Yadkin near the present railroad and highway bridges northeast of Salisbury. The slate belt lands from northwest of the junction of the Deep and Haw rivers to the Uharie River, in what is now Chatham and Randolph counties, Dobbs described as:

very high steep Hills... the rocks are mostly Marchasite or white Spar, but the soil intermixed with the rock and gravel a rich loamy red earth, an indication of a mineral soil, the oak and pine to the top of the Hills being of a tolerable size,...²²

21.Lawson, op. cit., pp. 54-56.

22.Dobbs to Board of Trade, Aug. 24, 1755, Colonial Records of N. C., v. 5, p. 355.

and having "a very rough bark" (strong bark history) on the outside and white, porous (yellow porous), white oak, and having a very rough bark. The bark is very rough and has a very rough bark. The bark is very rough and has a very rough bark.

The expedition in 1791 started at Washington, D.C., and went into the present, and returned to the coast on the Pamlico River in North Carolina. They then went to the Pamlico River and found the site of the first he had seen. The first he had seen was a "prolific evergreen pine-tree", the first he had seen. The first he had seen was a "prolific evergreen pine-tree", the first he had seen. The first he had seen was a "prolific evergreen pine-tree", the first he had seen.

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Arthur Dobbs, 1791. The first he had seen was a "prolific evergreen pine-tree", the first he had seen. The first he had seen was a "prolific evergreen pine-tree", the first he had seen. The first he had seen was a "prolific evergreen pine-tree", the first he had seen.

Possibly there was an increase in the number of pine in the slate belt in the 54 years from the visit of Lawson to that of Dobbs. The latter gives the impression that the trees were not very large. In the interval the Indians had abandoned the area and a sparse population of whites had entered. The evidence for the increase in pine is not conclusive, however, for the routes of the two men diverged east of the Uharie. Lawson proceeded northeast from there, but Dobbs approached the Uharie from south of east. Gravelly or stony soils such as these, having bedrock near the surface might support only small trees because of the inability of large ones to withstand windstorms. At one point Lawson's testimony regarding the smallness of the trees agrees with Dobbs.

According to Bishop August Gottlieb Spangenburg, who in 1753 arranged for the settlement of Moravians in North Carolina, there was a tract of woods on the Catawba River, probably near the present town of Hickory, consisting mostly of pine. The bishop said that the Indians had ruined the woods with fire in this place.²³ The site finally decided upon for the Moravian colony consisted of 79,000 acres including the present location of Winston-Salem and was called the Wachau or Wachovia. The surveyor of the colony listed pine as growing on certain sandy upland soils there. He made a classification of the lands of Wachovia including five categories:

²³.August Gottlieb Spangenburg, "Diary," in Records of the Moravians in North Carolina, edited by Adelaide M. Fries (Raleigh, 1922-), v. 1, p. 49.

...the first of the year from the point of view of the ...
...the interval the Indians had abandoned the spot ...
...the population of which had not been ...
...the place is not complete, however, for the ...
...the men divided east of the ...
...from there, but ...
...travelling or staying ...
...the ...
...of large ones to withstand ...
...testimony regarding the ...

...to Bishop August Gottlieb ...
...for the settlement of ...
...of woods on the ...
...of light, consisting mostly of pine. The ...
...the Indians had ...
...the site finally decided upon for the ...
...of 12,000 acres including the present location of ...
...and was called the ...
...the colony listed also as growing on ...
...He made a classification of the ...
...five categories:

...the ...
...the ...

- (a) Swamp, "soft or boggy land...plenty of this in the valleys and along the creeks, and it is the true meadow land."
- (b) "Bottom is the low, flat, dry land along the creeks, and it has usually the finest and strongest trees of the forest, oak, poplar, mulberry, hickory, maple, ash, and birch, and...is the best land for fields and meadows."
- (c) "Lowland is properly the lower, sloping land, but there is very little of this in the Wachau, for...the Upland follows [the Bottoms] immediately."
- (d) "Upland is all the land that is neither Swamp nor Bottom."
- (e) "Ridge is the high part of the Upland."²⁴

About 30 years after the Wachovia surveyor wrote, a Pennsylvania land speculator hunting for promising sites in upper North Carolina, found that there was much pine land around Salisbury, and northwest from there toward the mountains. It appears from his testimony that the amount of pine had increased in the period since the first settlement.²⁵

The valley of the upper Savannah River was visited by two trained naturalists in the eighteenth century. Mark Catesby came in 1722 and 1723 and William Bartram in the period 1773-1776. Catesby observed that the Piedmont, like much of the lower country, consisted of pine barren, oak, and hickory land. Probably he is referring to both the upper Coastal Plain and the section immediately above the fall line.²⁶ Bartram, on the other hand,

24. Christian Gottlieb Reuter, "Wachau or Dobbs Parish," ibid., v. 2, pp. 557-587.

25. A. R. Newsome, Editor, "John Brown's Journal of Travel in Western North Carolina in 1795," North Carolina Historical Review, v. 11 (Oct. 1934), pp. 285-314.

26. Mark Catesby, The Natural History of Carolina, Florida and the Bahama Islands (London, 1754), v. 2, p. iv.

(1) There is a "strong" correlation between the two variables and along the same line, the two variables are

from shore toward the mountain. It comes from

John Brown's Journal of Travel in America, 1845-1846

says nothing about pine growing in the Piedmont.

Bartram's description of the whole assemblage of topography, soil, and vegetation is detailed enough to deserve quotation at some length. On a day in May he:

set off [from Augusta, Ga.] proceeding for Fort James Dartmouth, at the confluence of the Broad River with Savannah, the road leading me near the banks of the river for the distance of near thirty miles, crossing two or three of its considerable branches, besides rivulets and smaller brooks. The surface of the land uneven, by means of ridges or chains of swelling hills and corresponding vales, with level downs; the soil a loose, grayish-brown loamy mould on the hills, but darker and more cohesive and humid in the vales and downs; this superficial, vegetative earth, covers a deep stratum of very tenaceous yellowish clay: the downs afford grass and various herbage; the vales and hills forest trees and shrubs of various tribes,...

In the "vales" and on the hills Bartram noted the giant black oak, Spanish oak, white oak and other kinds of oak, maples of various kinds, mulberry, hickory, elm, sweet gum, flowering dogwood, buckeye, honey locust, yellow poplar, persimmon, and plum. "Near the water courses in the vales" were found silky camillia, wild olive, buckeye, ironwood, azalea, cucumber tree, and two other types of magnolia. The next day the botanist went through:

... wild country almost depopulated, vast forests, expansive plains, and detached groves; then chains of hills whose gravelly, dry, barren summits presented detached piles of rocks, which delude...the expectations of the solitary traveller, full sure of hospitable habitations...

"In the sequestered rocky vales" along this route he found rhododendron. Above Dartmouth he crossed to the South Carolina side of the Savanna and proceeded northwest to the Cherokee Indian settlements at Seneca on the Keowee River. On this segment of

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his journey he found ash, beech, chestnut, chinkapin, and black gum.

Along the Keowee the face of the country was:

uneven, by means of ridges of hills and water courses; the hills somewhat rocky near their summits and at the banks of the rivers and creeks, but very fertil, as there is a good depth of loose dark and moist vegetative mould, on a stratum of reddish brown tenaceous clay, and sometimes a deep stratum of dusky brown marl...The flaming Azaleas abound, and illuminate the hillsides; and a...singularly beautiful species of *Aesculus pavia* [buck-eye], situated above them toward the summits of these low hills... The shrubs growing about the tops of the more barren grassy hills, where large trees are few and scattered, show themselves to great advantage...There are abundance of Grape vines (*Vitis vinifera*) which ramble and spread themselves over the shrubs and low trees in these situations...

In May of another year (ca.1773) Bartram explored the country lying between the Savannah and the Oconee rivers above the headwaters of the Ogeechee. After traveling along the bottom on the northeast side of the north branch of Little River, a tributary of the Savannah, he ascended a bank of 20 or 30 feet and entered "the most magnificent forest I have ever seen." The ground of the forest was a "perfectly level green plain, thinly planted by nature with the most stately forest trees." Several of the black oak here were found to be 30 feet in circumference at breast height. Bartram believed that they would measure 8 to 11 feet in diameter. The first branches were 40 or 50 feet above breast height. The other trees were equally stately. Bartram went for seven miles through this forest after which he found that the land ascended gently to "desart" plains, high

forests, and stony ridges.²⁷ Bartram does not mention either pine trees or woods fires. James Adair, however, informs us that the country of the Cherokees, which included the section of South Carolina penetrated by Bartram, was subject to woods fires.²⁸

Benjamin Hawkins, the Creek Indian agent, writing of the period 1798-1799, before the Creeks had been forced to leave central and western Georgia, gives the impression that the flat land along the upper courses of the Flint and Ocmulgee rivers supported a somewhat stunted forest growth. The stand consisted principally of post oak, black oak, hickory, and short leaf pine. Wild pea vine was seen on the hills and in the valleys, and on the richest land a tall broad-leaved grass. Farther west along the Tallapoosa, Coosa, and Chatahoochee, one found in addition to the trees listed above, white oak and chestnut. Hawkins complained that there was little fruit to be found throughout the entire country of the Creek Indians. In some rich flats there were fox grapes and muscadines; but the "small cluster grapes of the hills is destroyed by the fire, and the persimmon, haw and chestnut by the hatchet."²⁹

27. William Bartram, Travels Through North and South Carolina, East and West Florida (2nd edition, London, 1794), pp. 36-38, 318-328.

28. [James Adair], Adair's History of the American Indians, edited by Samuel Cole Williams (Johnson City, Tenn., 1930) [Original edition, London, 1775], p. 248.

29. Benjamin Hawkins, A Sketch of the Creek Country in 1798, and 99, Georgia Historical Society Collections, v. 3, pt. 1 (New York, 1848), pp. 19-20, 24.

A somewhat more detailed description of the vegetation near the headwaters of the Ocmulgee, in Newton County, Ga., was given by a settler in 1824, 3 years after the area was opened to settlement. Writing to his brother-in-law in North Carolina he said:

...the groth [sic] is oak pine poplar hickory dog wood lin [lin-
den?] [sic] buck eye white and red shumake [sic] white and
prickly ash grape vine and rich land weeds the grass range good
on the upland cane in the bottom land on the ridges chestnut
timber and chinckapin [sic] the swamps have beach [sic] and
sweet gum and other groths simular [sic] to the swamps in North
Carolina in summing up the whole I consider it a very desirable
cuntry [sic].³⁰

On the basis of the testimony of explorers and settlers one concludes that pine was irregularly distributed in the Piedmont in pre-settlement times, that it was to be found in many areas that had been burned over or otherwise disturbed, but that in other areas that had been disturbed it was not present. Within 50 years or less after settlement began its distribution was widespread. Factors of drainage, topography, and soil were important in determining its distribution in the pre-settlement forest. Lawson, Catesby, and Dobbs seem to indicate that there was more pine in the lower part of the region, near the fall line, than toward the mountains. This is logical in view of the

30. Joseph L. Lowrance to Samuel Guy, Newton Co., Ga., Sept. 10, 1824. George F. Davidson Papers, Duke University Library, Durham, N. C. By "swamp" Lowrance apparently meant the bottom land, or land subject to overflow by the streams, but not necessarily wet at all seasons.

... to his brother-in-law in North Carolina he ... 3 years after the area was opened to set- ... in Newton County, Ga., was given

predominantly coniferous forest of the Coastal Plain. This and the decrease in pine to the north toward the Virginia-North Carolina boundary, indicated by Byrd, may have been due to climatic factors.

Possibilities of Soil Erosion in Pre-Settlement Times

Fortunately it is not necessary to rely upon the distribution of pines in attempting to determine the prevalence of woods fires in pre-settlement times, for there are many accounts of burned over areas. William Gerard DeBrahm, surveyor general of South Carolina in the late colonial period, believed that if it were not for the fact that the trees themselves did not easily catch fire all the forests in America would have been burned down before any European arrived.³¹ Some of the burning was probably due to lightning, but most of it was caused by the Indians, either by accident or design. The aborigines burned the surface under the trees to facilitate the growth of young forage for game. Fire was also used in driving the animals to a given point where the hunters could more easily kill them. One writer has estimated that in Virginia the Indians had deforested 30-40 acres per capita of the population by the time white men arrived, and

31. William Gerard DeBrahm, "Philosophico-Historico-Hydro-geography of South Carolina, Georgia and East Florida [1772]," in Documents Connected with the History of South Carolina, edited by Flowden Charles Jennett Weston (London, 1856), p. 181.

that most of this had been accomplished by fire.³²

Byrd thought that burning was not so prevalent in the upper country as in the settled areas close to the coast. He supposed that fires occurred only every few years in the upper wilderness, but that the dead leaves and twigs that accumulated in this time caused so great a conflagration when finally ignited that large tracts were left with no large trees standing. Near the western end of the dividing line the survey party approached the warpath used by northern Indians going to attack southern tribes. Fires spreading from the camps of these Indians threatened to consume all the forage in the woods so necessary for the horses of the party. On several days the smoke obscured the mountains.³³ Four years after the survey of the dividing line Byrd returned to the vicinity of the junction of Dan and Smith's rivers to survey some land of his own that he called Land of Eden on the North Carolina side of the line. In that time the boundary had already become "dim" because many of the marked trees had been blown down or burned. Along the southern border of his Eden tract Byrd found that the upland woods were very thin because of fires in the past. Even such trees as were left standing were fit for little except fuel or fence rails.³⁴ Governor Dobbs of North Carolina

32. Hu Maxwell, "The Use and Abuse of Forests by the Virginia Indians," William and Mary College Quarterly Historical Magazine, v. 19 (Oct. 1910), pp. 73-103.

33. Byrd, Histories, pp. 228-231.

34. William Byrd, The Westover Manuscripts: Containing the History of the Dividing Line Betwixt Virginia and North Carolina;

...in the settled areas along the coast. He reported that there were only a few years in the past when the dead leaves and twigs that accumulated in this time caused so great a conflagration when finally ignited that large trunks were left with no large trees standing. Near the western end of the dividing line the survey party approached the western end of northern Indians going to attack southern tribes. When approaching the camp of these Indians threatened to consume all the crops in the woods so necessary for the horses of the party. On several days the smoke obscured the mountains. For years after the survey of the dividing line had returned to the vicinity of the junction of Dan and Smith's rivers to survey some land of his own that he called land of Neen on the North Carolina side of the line. In that time the boundary had already become very narrow many of the marked trees had been blown down or burnt. Along the southern border of his Neen tract (now found out the woods were very thin because at times in the past. Even such trees as were left standing were left for little except for fence rails. Governor Dobbs of North Carolina

even believed that the sterility of the sand hills section of the upper Coastal Plain was due to the fact that in the course of time the fruitful topsoil had been burned off, leaving only the sand.³⁵

Remarks such as these of Byrd and Dobbs raise the question of the amount of soil erosion in pre-settlement times. Dobbs, it is true, referred to areas where settlement had begun, but this was not true of Byrd. If Byrd was right in his estimate of the amount of damage caused by woods fires it seems logical that a limited amount of surface washing might have taken place on sloping, burned areas. A fire great enough to destroy large trees would probably destroy the undergrowth and surface litter as well; sheet erosion and rilling might have taken place for a few years until a thicket of "saplings" such as Byrd described was established. Certainly surface washing of the soil was not widespread at any one time, for there seem to be no unmistakable recorded instances of it before settlement, nor was it sufficient to discolor the streams at their normal stages.

Most of the early explorers of the Piedmont mentioned the clearness of the streams. Lawson said that the waters "for several hundreds of Miles towards the Heads of the Rivers" were of

A Journey to the Land of Eden, A. D. 1733; and a Progress to the Mines (Petersburg, 1841). Hereafter cited as Journey to the Land of Eden.

^{35.}Dobbs to Board of Trade, Aug. 24, 1755, in Colonial Records of North Carolina, v. 5, p. 354.

from which the sterility of the sand hills section of
the Upper Coastal plain was due to the fact that in the course
of the last glacial period the water table had fallen to
the level of the sea.

It is such as these of Hyrd and Debs raise the question
of the amount of soil erosion in pre-settlement times. It is
to be noted, referred to areas where settlement had begun, but
this was not true of Hyrd. If Hyrd was right in his estimate of
the amount of damage caused by weeds there is some reason to
believe that a further amount of soil erosion would have been
caused by weeds. A fine great enough to destroy large
trees would probably destroy the undergrowth and surface litter
as well: forest erosion and killing might have taken place for a
long time, a thicket of "saplings" such as Hyrd described
was established. Certainly surface washing of the soil was
eliminated at any one time, for there was no no immediate
removal of instances of it before settlement, nor was it eliminated
by the streams at their normal stages.

That of the early explorers of the river mentioned the
erosion of the stream. Lawson said that the water "lay over
and around of holes toward the head of the river" was at

A report to the U.S. Geological Survey, 1894, by J. W. Lawson, p. 11.
The following is a list of the names of the places mentioned in the report.

The following is a list of the names of the places mentioned in the report.

a bluish color. In another place he called the Yadkin River "this Silver-Stream."³⁶ Concerning the Roanoke, Byrd wrote:

...the River is 49 Poles wide, and rolls down a crystal Stream of very Sweet water, Insomuch that when there comes to be a great Monarch in this Part of the World, he will cause all the Water for his own Table to be brought from Roanoak, as the great Kings of Persia did theirs from the Nile and Choaspis, because the waters of those Rivers were light and not apt to corrupt.³⁷

John Tobler explored the vicinity of Beech Island, S. C., near the Savannah River, in the upper Coastal Plain, in 1737, preparatory to settling some of his German-Swiss countrymen there. He wrote:

If one comes far from the sea, it often has little mountains, which are, however, not so steep & high as with you [in Switzerland]... Besides, the land is well supplied with fine navigable rivers & very many tributaries which flow into the large ones. The water in them is very light and good & does nothing to one however much one drinks, except that heed be taken that it would purge if much were drunk.³⁸

Probably the streams, or some of them, were discolored by the silt load carried during times of flood. Byrd and his party came upon a stream called by the Indians Massamoni, or Paint Creek because the red "ochre" in its banks discolored the water in times of freshets.³⁹ In 1722 there was a flood on the Savannah during

36. Lawson, op. cit., pp. 28, 45. 37. Byrd, Histories, p. 156.

38. John Tobler, "The John Tobler Manuscripts: an Account of German-Swiss Emigrants in South Carolina, 1737," edited by Chas. G. Cordle, Journal of Southern History, v. 5 (Feb. 1939), pp. 83-97.

39. Byrd, Histories, p. 164.

...the river... the water... the river... the water...

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which the water rose 29 feet in less than 40 hours at Fort Moore, near the site of Augusta, Ga. According to Catesby the fertile low ground opposite the fort formerly occupied by the Savannah Indians was covered 3 feet in depth with sand and made unfit for cultivation. This sand, said Catesby, was not carried from the high ground, but was washed from the steep banks of the river. The freshet was caused by rains in the mountains, there having been none at Fort Moore.⁴⁰

The English geologist, Sir Charles Lyell, was informed in 1846 that the river Altamaha and its tributaries had been clear even in time of flood before the country was settled, but he received his data secondhand.⁴¹ This statement was probably only a half truth. In the light of the earlier writings it seems likely that the rivers carried a silt load of no small magnitude during floods, and were accordingly discolored during these periods.

Granted that there may have been a limited amount of sheet erosion following woods fires, and that woods fires were of rather common occurrence, the question arises as to how long burning had been going on at the time of the arrival of white men. The old theory that the bison, his antagonist the Indian hunter, and the hunter's weapon, fire, all advanced together from the west into the virgin forest of eastern North America, and that

40.Catesby, op. cit., v. 2, p. vii.

41.Charles Lyell, A Second Visit to the United States of North America (London, 1849), v. 1, p. 344.

...the water was 25 feet in less than 40 hours at Fort Moore.
...According to Caterer, the ...
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...3 feet in depth with sand and was unfit for
...this sand, said Caterer, was not carried from the
...but was washed from the steep banks of the river.
...was caused by rains in the mountains, there having
...at Fort Moore.

The English geologist, Sir Charles Powell, was informed in
...river. Atkinson and its tributaries had been closed
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...and were accordingly discolored during these

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...following woods fires, and that woods fires were of
...occurrence, the question arises as to how long dur-
...on at the time of the arrival of white men.
...the theory that the person, his companion the Indian hunter,
...the hunter's weapon, fire, all advanced together from the
...

this section was reaching a climax in its "ordeal of fire" that might have resulted in a grassland vegetation had Europeans not arrived, is apparently no longer tenable.⁴² In recent geologic times there have been several alterations between humid and dry, cold and warm, in the climate of eastern North America, and these have been accompanied by changes in the flora and fauna. Sears suggests that the most recent change, beginning approximately 1,000 years ago, has been toward a cooler and more humid climate, signified by an increase in the forested area and a decrease in bison.

At the same time there was probably a shift away from a sedentary agricultural economy such as practiced by the mound builders toward one with more emphasis on hunting, like that of the tribes of historic time.⁴³ Possibly such a shift might have been accompanied by increase in woods burning, but the evidence indicates that climatic change, rather than fire, was responsible for large scale changes in vegetation.

Studies of former surface levels and buried organic matter in the Southern Piedmont by Eargle and Cain for the Soil Conservation Service further emphasize past changes in environment. Fir and spruce pollen in the buried organic matter indicate a cooler climate at some time in the past, and there are indications that

⁴²Maxwell, loc. cit.

⁴³Paul B. Sears, "The Archaeology of Environment in Eastern North America," American Anthropologist, v. 34 (Oct-Dec. 1932), pp. 610-622.

the surface was becoming a cinder in the "crater of fire" that
 might have resulted in a grassland vegetation had human beings not
 appeared. It is possible, however, that in recent geological
 times there have been several alternations between humid and arid
 conditions. In the climate of eastern North America, and elsewhere,
 there have been accompanied by changes in the flora and fauna. It
 suggests that the most recent change, beginning approximately
 1,000 years ago, has been toward a cooler and more humid climate,
 indicated by an increase in the forested area and a decrease in

the open area. This there was probably a shift away from a more
 dry vegetation toward a more humid one, indicated by the increase in forest
 area and the decrease in open area. It is possible that at the time
 of historic times, possibly such a shift might have been accom-
 panied by changes in the flora and fauna, but the evidence indicates
 that the climate was still dry and the vegetation was still
 open. It is possible that the former surface levels and buried organic matter in
 the surface, indicated by the increase in forest area and the decrease in
 open area, further evidence that changes in environment. The
 increase in forest area in the buried organic matter indicates a cooler
 climate at some time in the past, and there are indications that

U. S. Geological Survey, Washington, D. C.

U. S. Geological Survey, "The Geology of the National Monument, New Mexico,"
 Geological Survey Bulletin, v. 10, (1905-1906), p. 10.

burning occurred during some periods but was absent or of little importance during others. The exact dates of the buried organic matter are not yet known. It is covered by thick layers of clay, sand and gravel evidently brought from higher ground by the processes of mass movement and sheet wash in fairly recent geologic time.⁴⁴

The passages from Bartram already quoted contain the best eighteenth century descriptions of Piedmont soils to be found, but other writers were not silent on the subject. Bartram describes the full soil profile normal to the region, giving no hint that it might have been truncated by accelerated erosion. We cannot be so sure that Lawson did not see an eroded soil. Concerning the territory of the Waxhaw Indians in what is now Lancaster County, South Carolina, near the North Carolina line, Lawson wrote:

...the Land hereabouts,...is a Marl [clay?] as red as Blood, and will lather like Soap. The Town stands on this land, which holds considerably farther in the Country,...I have formerly seen the like in Leicestershire, bordering upon Rutland. Here are Corn-Stalks in their Fields as thick as the Small of a Man's Leg, and they are ordinarily to be seen.⁴⁵

Farther along, at the town of the Keyauwees on Caraway Creek, in the modern Randolph County, N. C., Lawson observed:

44.D. Hoyer Eargle, "The Relations of Soils and Surface in the South Carolina Piedmont," Science, n.s., v. 91 (April 5, 1940), pp. 337-338.

45.Lawson, op. cit., pp. 36-37.

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Further along, at the town of the ... on ...
in the ... County, N. C., ...

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[they have] Large Corn-Fields joining to their Cabins, and a Savanna near the Town at the Foot of these Mountains, that is capable of keeping some hundred Heads of Cattle. And all this environed round with very high Mountains...Those high Clifts have no Grass growing on them, and very few Trees, which are very short, and stand at a great Distance one from another. The earth is of a Red Colour and seems to me to be wholly designed by Nature for the Production of Minerals, being of too hot a Quality to suffer any Verdure upon its Surface.⁴⁶

It is evident from the reference to the cornstalks that Lawson was occasionally given to exaggeration, but there is no reason to doubt his description of soil color. Indian towns were in nearly every instance located close to streams, on the first or second bottoms. There are first and second bottom soils that have reddish subsoils, but the surface horizons are dark-colored. Respecting the Waxhaw settlement one concludes that either: (1) Lawson observed the soil along a stream bank, Indian trail or other worn down place where he could see it in profile; or (2) tillage operations in the Indian cornfield had brought some of the red soil to the surface; or (3) the field was located on sloping upland and was subject to sheet erosion. The suggestion of barrenness in the description of the "high Clifts" near the Keyauwee town was probably due to the rock outcrops in these hills and the fact that Lawson saw them in winter. Probably the subsoil was also exposed in places on the steep slopes. Nevertheless at the present time one does not gain the impression that there are "very few Trees" on the hills, even in winter. The forest here seems to have been much more open then than now.

⁴⁶Ibid., pp. 48-49.

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It is evident from the reference to the communication that the
... was substantially given to the examination, but there is no reason
... in that the description of the color. Indian houses were in
... nearly every instance located close to the river, on the right or
... second houses. There are three and second bottom soils that
... have been found (see the list of houses and their locations).
... regarding the weather conditions and concludes that either: (1)
... houses observed the soil along a stream bank, Indian houses or
... other can now place where he could see it in the field; or (2)
... Indian questions in the Indian country had sought some of
... the soil to the surface; or (3) the field was located on
... exposed surface and was subject to sheet erosion. The suggestion
... in the description of the "high cliffs" near the
... exposure that was probably due to the rock outcrops in these
... cliffs and the fact that the houses were in the river. Probably
... were also exposed in places on the steep slopes. However
... the present time and does not gain the impression that
... the "high cliffs" are now in a state of erosion. The
... there may have been much more open than now.

Bishop Spangenburg, like Bartram and Lawson, was able to find exposures of subsoil in places. One of the tracts surveyed by his party was on the Yadkin River where Lewis Fork, Warrior Fork, and Crain's Mill Creek enter it, in the present Wilkes County, N. C. Describing the tract, Spangenburg said: "The soil is sandy, not pure sand but mixed with red earth,--a rich, warm soil." He seems to refer to the soil of the bottom land principally. Farther down the Yadkin, at the site of Wilkesboro, the party surveyed another tract that was said to have,

Rich soil, mixed with sand,--the color of a mulatto. * * * On the hills are stones, which can perhaps be used in building. There is no limestone, but we are told that there is clay, which becomes hard as stone, when exposed to the air. The truth of this remains to be proved.⁴⁷

The suggestion was made above that Lawson may have seen a cross section exposure of soil along some Indian trail. The present writer has found no contemporary allusions to such exposures, or to gullying caused by Indian trails. It seems reasonable, however, that there might have been places along trails where gullies could develop. There were many Indian trails in the Piedmont.⁴⁸ The frequency with which Indian trails ran along the interfluvial ridges has often been emphasized, but in as many

47. Spangenburg, "Diary," Moravian Records, v. 1, p. 58.

48. William E. Myer, "Indian Trails of the Southeast," edited by John R. Swanton, in Forty-Second Annual Report of the Bureau of American Ethnology to the Secretary of the Smithsonian Institution, 1924-1925 (Washington, 1928), pp. 727-857.

instances they followed major rivers, crossing the tributaries near their mouths, or cut directly across the drainage pattern of an area. Thus, the Old Cherokee Path to Virginia in the segment from Old Keowee, in South Carolina, to the upper Yadkin River, crossed the Saluda, Enoree, and upper Broad. Similarly, the Occaneechi Path, or the Trading Path, after leaving Petersburg, Va., crossed the Roanoke, paralleled the Eno, then crossed the Haw, Deep, Uharie, Yadkin, and Rocky rivers.⁴⁹ A southward extension of this path ran near the western bank of the Catawba from the Catawba Indian towns to a point below the junction of Wateree Creek and Catawba River in South Carolina.

In pre-Columbian times the capacity of moccasined feet to wear deep ruts in the earth was probably limited, but at points where the trails descended valley flanks to cross streams there may have been concentration of running water during rains and shallow gullies may have developed. Later white traders coming inland to traffic with the Indians brought their goods by pack horse along these same routes. Just as the horses' hoofs had greater cutting power than Indian moccasins, so the enlarged and deepened trails had increased gully-forming potential. At length the clearing of the first upland fields by settlers and the arrival of wagons along the trails heralded the opening of a new cycle of soil erosion.

⁴⁹ Douglas L. Rights, "The Trading Path to the Indians," N. C. Hist. Rev., v. 8 (Oct. 1931), pp. 403-426.

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The Columbia River the capacity of increased foot to
the river is the only one which is not
the river descends valley flanks to cross between those
and have been concentration of running water during rains and
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trains along these same routes. Just as the horses' loads had
greater carrying power than Indian packmen, so the enlarged and
improved trails had increased half-tonnage potential. At present
the clearing of the forest opened fields by settlers and the ar-
rival of steamships and trails (1811) the power of a river
to carry its load.

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It is extremely difficult to find an old trail still preserved as it existed in pre-Columbian times or even in the time of the Indian traders. A deeply worn section of trail, said by local tradition to be part of the Trading Path, is to be seen in an undisturbed woodland tract 9 miles north of Durham, N. C. At a point in the woods where it crosses a small creek there are some shallow gullies, now dormant. Evidently this represents as near an approach to pre-settlement conditions as can be found today, but even here there are signs that wagons used the trail at some time in the past.⁵⁰

Bison and deer coming down to water or to cross the streams might also have disturbed the surface sufficiently to form gullies. Catesby refers to watering places of the buffalo in the canebrakes bordering the rivers and creeks. At the site of Spangenburg's first survey the banks of the streams were said to be so high that they were not passable for men on horseback except where the buffalo had broken them down.⁵¹ Buffalo licks or deer licks formed other exposed places where accelerated erosion might have had some effect, but generally they were in low places. The Great Buffalo Lick in Georgia, for instance, was located near the headwaters of Ogeechee River between a cane swamp and meadows on the southeast and higher ground on the northwest. It covered

50. The writer is indebted to Dr. Nannie M. Tilley, formerly of Duke University Library, for information about this trail and assistance in locating it.

51. Spangenburg, "Diary," Moravian Records, v. 1, p. 45.

[illegible]

There are two points in the history of the river which are of importance. The first is the fact that the river was first discovered by the Spaniards in 1540. The second is the fact that the river was first mapped by the English in 1791.

some three or four acres and the white clay was licked into large holes or caves by the animals that frequented it.⁵² The Lick creeks or Lick branches to be found in various localities in the Piedmont commemorate the existence of other such places.

Openings in the Forest

The Southern Piedmont was not covered by an unbroken forest. A summary description of Virginia published in 1724 indicates this fact and gives the popular names of the different kinds of forest openings.

The whole country is a perfect forest, except where the woods are cleared for plantations and old fields and where formerly have been Indian towns, and poisoned fields and meadows where the timber has been burned down in fire hunting or otherwise; and about the creeks and rivers are large rank morasses or marshes; and up the country are poor savannahs.⁵³

The open areas caused by human activities were the Indian fields and such "poisoned fields" as had been caused by fire hunting. It was suggested above that the role of fire in forming and maintaining prairies or other open areas in the eastern United States has been overestimated. In Ohio, for instance, the occurrence of such areas was related to drainage and the former

52. Bartram, op. cit., p. 39.

53. Hugh Jones, The Present State of Virginia (New York, 1865; reprint of the edition of London, 1724), pp. 35-36.

some times in their holes and the white clay was licked into large
scales on walls in the animals' dens. In some cases
evidence of their presence to be found in various localities in the
vicinity of the holes the existence of other such places.

Opuntia in the Forest

The Opuntia forest was not covered by an impenetrable forest.
A survey conducted in Virginia published in 1924 indicates
this fact and shows the popular names of the different kinds of
Opuntia species.

The Opuntia forest is a typical forest, mostly where the soil is
fertile, the vegetation and old fields and where formerly have
been fields, but where the fields and meadows where the Opun-
tia has been found and the forest on otherwise; and about
the Opuntia and where the forest is not so dense; and the
forest is the Opuntia forest.

The Opuntia forest is a typical forest, mostly where the soil is
fertile, the vegetation and old fields and where formerly have
been fields, but where the fields and meadows where the Opun-
tia has been found and the forest on otherwise; and about
the Opuntia and where the forest is not so dense; and the
forest is the Opuntia forest.

Opuntia forest, Virginia, New York, 1924.
Opuntia forest, Virginia, New York, 1924.
Opuntia forest, Virginia, New York, 1924.

positions of the ice sheet.⁵⁴ Doubtless soil conditions, drainage, and topography played important parts in causing forest openings in the Piedmont also, with fire being a contributing factor.

Map No. 2 in Appendix 3 shows the principal Indian village sites in the Southern Piedmont of which there are historical records. The population was somewhat more dense than elsewhere on the Catawba River near the North Carolina-South Carolina boundary, in northwestern South Carolina, and in western Georgia, that is, among the Catawba, Cherokee, and Creek tribes.⁵⁵ The small tribes of the Virginia and North Carolina Piedmont became so reduced from attacks by the Iroquois of New York and from contact with the white man that they merged with other tribes about a century after permanent English settlement on the continent began. From about 1715 to about 1740, when white pioneers started coming in, this part of the region was practically deserted by human inhabitants. The same was true of eastern Georgia until after 1773, although the Creeks and Cherokees claimed it as their hunting ground. Many Indian sites described by early writers were accordingly old fields where native vegetation had replaced Indian crops.

Indian fields, although confined to areas near the streams, were often rather large. In 1670 the fields attached to the

54. Paul B. Sears, "Natural Vegetation of Ohio," Ohio Journal of Science, v. 25 (May 1925), pp. 139-149; v. 26 (May 1926), pp. 128-146; (July 1926), pp. 213-231.

55. James Mooney, The Aboriginal Population of America North of Mexico, Smithsonian Miscellaneous Collections, v. 80, no. 7 (Washington, 1928), pp. 6-9.

position of the ... played important parts in ... forest ... with fire being a contributing factor.

Figure 2 in Appendix 3 shows the principal Indian villages ... the Southern Piedmont of which there are historical ... the population was somewhat more dense than elsewhere on ... the ... River near the North Carolina-South Carolina boundary. ... in ... North Carolina, and in western Georgia, that is, ... the ... Creek, Cherokee, and Creek tribes. The small ...

of the ... and North Carolina Piedmont became so reduced ... by the products of New York and from contact with ... that they merged with other tribes about a century ... English settlement on the continent began. From ... this part of the region was practically deserted by human inhabi-

tion. The same was true of eastern Georgia until after 1775, ... the Creek and Cherokee claimed it as their hunting ...

... In 1870 the ... rather large.

Vegetation of ...
... v. 10 (1910), pp. 213-221.
... v. 10 (1910), pp. 213-221.
... v. 10 (1910), pp. 213-221.

Monacan town extended for three miles along the south bank of the James River in the present Powhatan County, Va.⁵⁶ Lawson traveled for half a day or longer through cleared land going from the Wateree to the Waxhaw towns in upper South Carolina, and Adair informs us that the Catawbas and their affiliates in the same area had an old field "seven miles in extent" and several others of smaller dimensions.⁵⁷ In the 1770's when Bartram visited the Cherokees on Keowee River in South Carolina they were in a state of decline, but their former fields and villages stretched for several miles along the river.⁵⁸

The Indians killed the trees in an intended field by stripping off a girdle of bark, and the underbrush was destroyed by fire. When the ground was sufficiently clear to allow tillage the corn, beans, squash, and other less important objects of cultivation were planted, sometimes together in the same patch, sometimes separately. The principal, and in many cases the only tool used was the so-called planting stick. Unless war or some other catastrophe compelled a move, village sites were occupied for long periods. It is possible, therefore, that the large size of some fields was due to progressive clearing as the older portions of the tilled area declined in productivity. The tribes in New

56. James Mooney, The Siouan Tribes of the East, Smithsonian Institution, Bureau of Ethnology, Bul. no. 22 (Washington, 1894), p. 28.

57. Lawson, op. cit., pp. 28-29; Adair, op. cit., p. 236.

58. Bartram, op. cit., p. 38.

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the distance to the nearest town in Upper South Carolina, and
this led us to the fact that the Cherokee and their allies in the
area were not as well organized as they were in the past.
The Cherokee in the 1790's when they were
settled on the River in South Carolina they were
in a state of decline and were not as well
organized as several miles along the river.

[illegible]

England, for instance, had a phrase signifying "worn out field." At the end of the eighteenth century the land of the Cuseta town of the Lower Creeks, on the Georgia side of the Chattahoochee River just below the fall line, was mostly exhausted, for it had been "cultivated beyond the memory of the oldest man." Hawkins, the agent of the Federal Government in this period, was trying to get the Creeks to settle out away from their compact towns and to farm like white men.⁵⁹ The cycle of clearing, tillage, and abandonment of a field as practiced by the savages has been called the "rotation of fields" by Carrier.⁶⁰

The vegetation found on abandoned Indian fields depended, of course, upon the length of time they had been abandoned, the nature of the site, kind of seed sources in the surrounding area, and other ecologic factors. While near the Wateree River in South Carolina, Lawson saw old fields covered with fine bladed grasses and strawberry "vines." Spangenburg's survey on the headwaters of New River in Watauga County, North Carolina, in the mountain region, included an old Indian field where there was much grass. Unlike the sites previously chosen by the Bishop in the Piedmont, there was no cane here. In one of the surveys in Caldwell County at the extreme upper edge of the Piedmont, he found what he termed "tame" grass on the Indian dwelling sites.

59. Hawkins, op. cit., p. 58 et passim.

60. Lyman Carrier, The Beginnings of Agriculture in America (New York, 1923), p. 97.

He guessed that the savages had lived there 50 years previously.⁶¹

William Byrd patented the three islands in the Roanoke River at the confluence of the Dan and Staunton about 1733. The Occaneechi Indians had lived here formerly. In the old fields in the upper island Byrd found grass as tall as a horse and rider. There were also wild hops in the island, although it was not stated specifically that they grew in the old fields. In the wooded parts of the island was a sort of vetch or wild pea. Another Indian locality described by Byrd was on Dan River near Land of Eden, on a peninsula between "Sauro" Creek and the River, but out of reach of the floods. It had been the home of the Cheraw tribe some 20 to 30 years previously. Here again Byrd described the grass as being high as a man on horseback.⁶²

Bartram found the whole river plain along the Keowee at the abandoned Cherokee towns covered with strawberries. In northeastern Georgia, in the territory already described, the naturalist found Indian sites abandoned so long that timber was growing on the old fields. The growth included persimmon, honey locust, Chickasaw plum, French mulberry, red mulberry, shell bark hickory, and black walnut. Bartram erroneously believed that these trees had been cultivated by the savages for their fruit.⁶³ The fact that writers did not mention pine as an old field plant

61. Spangenburg, "Diary," Moravian Records, v. 1, pp. 52, 56.

62. Journey to the Land of Eden, pp. 105-106, 112-113.

63. Bartram, op. cit., p. 38.

The writer did not mention pine as an old field plant. The growth included persimmon, honey locust, black walnut, Trench milkberry, red milkberry, shrill berry, and black walnut. Earlier erroneously believed that the territory already described, the native writer from Iowa also described as being the same. He considered the grass as being high as a man on horseback. There were some 20 to 30 years previously. Here again, bird was not at each of the floods. It has been the home of the last of the grass, and a considerable amount of the grass. The writer Indian locality described by bird was on the river near the mouth of the island was a sort of vetch or wild pea. The writer questioned that they grow in the old fields. In the grass was also, this was in the island, although it was the same. The writer bird found grass as tall as a horse and rider. The writer and bird home formerly. In the old field is at the mouth of the San and Stumton about 1875. The grass is the same.

on Indian sites may be related to the low topographic position of the fields. Pines may have found too much competition from more mesophytic plants.⁶⁴ Much of the grass found on Indian old fields was undoubtedly the broomsedge (Andropogon, spp.) This grass had been found and named by Virginians at an early date.

The openings in the original forest other than Indian sites can be classified into three groups: meadows, wet savannas, and dry savannas. These terms will be used merely for convenience; they do not always correspond with the names given in the contemporary literature, for the writers do not always agree among themselves in the use of terms.

Meadows were grassy or canebrake areas along the margins of streams. Writing of the Meherrin River, in 1716, John Fontaine said:

We saw several fine tracts of land and plains called savannas which lie along the river side, much like our low meadow lands in England. Neither tree nor shrub grows here, nothing but good grass, which for want of being mowed or eaten by cattle grows rank and coarse. These places are not miry, but are good firm ground. They are subject to inundation, when the rivers overflow, and after great rains, but there is seldom over six or eight inches of water, which might be prevented by ditching.⁶⁵

In such places were to be found the two species of cane native to the region, the giant and the small, or "maiden" cane. Spangenburg encountered the cane in nearly every tract he surveyed. He named one tract Grünen because of the greenness retained by the

⁶⁴. There may have been no pines nearby to seed the Indian fields.

⁶⁵. Journal, Memoirs of a Huguenot Family, pp. 271-272.

in Indian times may be related to the low topographic position of
the island. These two facts have been suggested as the
possible cause. Much of the grass found on Indian islands
is the same as the grass found in the Philippines (Paspalum, etc.). This
grass has been found and named by Virginians at an early date.
The species in the original forest other than Indian rice
can be identified with those found in the Philippines.
The forest will be used mostly for commercial
purposes. It is not always correspond with the names given in the con-
temporary literature. For the various reasons given above, the
names in the text are given.

It is not possible to find any other reliable evidence
which the island was forested, except the low narrow island
in England. The forest was not much more than a
grass, which was used for cattle grazing.
The forest was not much more than a grass, which was used for cattle grazing.
The forest was not much more than a grass, which was used for cattle grazing.
The forest was not much more than a grass, which was used for cattle grazing.

In some places where the forest was not much more than a grass, which was used for cattle grazing.
The forest was not much more than a grass, which was used for cattle grazing.
The forest was not much more than a grass, which was used for cattle grazing.
The forest was not much more than a grass, which was used for cattle grazing.

At present, there are no pine trees in the Indian islands.
The forest was not much more than a grass, which was used for cattle grazing.

maiden cane in the winter when he saw it.⁶⁶

On the west bank of the Dan River, where Byrd's party crossed that stream the first time, was found a "forest" of canes. Byrd said:

They grow so thick, and their Roots lace together so firmly, that they are the best Guard that can be of the River-Bank, which you'd otherwise be washt away by the frequent Inundations that happen in this part of the World.⁶⁷

Because of the luxuriant growth of cane and shrubs the surveyors of the colonial boundary usually found their hardest work in the river bottoms.

There are large areas of rather level, poorly drained soils in the Piedmont now classified as Iredell or Mecklenburg and popularly called "blackjack land." These constituted the wet savannas. The popular term is, or formerly was, also applied to rough or rolling areas where the soil would probably now be classified as Wilkes. According to tradition current in South Carolina about the middle of the last century, these lands were mostly unforested, and were the sites of many of the first settlements. Areas thus described by tradition were around the town of Ninety-Six in Abbeville District, the watersheds of Wateree and Dutchmans creeks in Fairfield District, and a good part of Chester and York Districts.⁶⁸

66. Spangenburg, "Diary," Moravian Records, v. 1, pp. 45-47, 58, 59.

67. Byrd, Histories, pp. 192, 194.

68. Oscar M. Lieber, Report on the Survey of South Carolina: Being the First Annual Report (Columbia, 1856), pp. 107-109.

... was found a "forest" of cane. And

only

... and their roots were found as thick, that
... of the river-land, which
... the frequent landslides
... in this part of the valley.

... of the luxuriant growth of cane and shade the survivors
... of the valley, which ...
... were found.

There are large areas of rather level, poorly drained soils
... now classified as "black jack land." These constituted the wet
... the popular term is, or formerly was, also applied to
... According to tradition current in local circles
... the middle of the last century, these lands were water-
... and some the sites of many of the first settle-
... then described by tradition were around the town
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The site of Ninety-Six is said to have had few trees and to have been covered with tall canes.

There is a smooth area of Iredell loam, mixed phase, in north-eastern Rockingham County, N. C., crossing the State line into Virginia.⁶⁹ The section corresponding to this was described by Byrd as a dead level, moist in many places, producing "abundant" grasses. It supported no trees except butterwood, or white maple. Such places were called highland ponds and, according to Byrd, were sought out by the Indian traders in winter so that their worn-out horses could feed on the green grass.⁷⁰ In Putnam County, Ga., Iredell loam and Mecklenburg loam occur together in a low, flat body of land known as the Glades.⁷¹ The State land survey, made in 1804 and 1805, about the time the section was opened to settlement, shows that a larger number of stakes than usual were used as corner markers, indicating a probable dearth of trees suitable for that purpose.⁷² There was also a higher proportion of blackjacks than usual among the trees that were marked. However, there is nothing on the map of the survey to

69. R. C. Journey, W. A. Davis, Soil Survey of Rockingham County, No. 7, ser. of 1926, U.S.D.A., Bureau of Chem. & Soils [Washington, 1926]. Reports in this series are hereafter cited as Soil Survey [name of area, date].

70. Byrd, Histories, p. 212.

71. Soil Survey, Oconee, Morgan, Greene and Putnam Counties, Georgia, 1919.

72. Maps of State land surveys, Districts 3 and 4 (originally in Baldwin County), Georgia, MSS, Office of Secretary of State, Atlanta, Ga.

The site of the ... is said to have had few trees ...
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... crossing the State line into
... The section corresponding to this was described by
... level, moist in many places, producing "abundant"
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... were sought out by the Indian traders in winter so that
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U.S. GEOLOGICAL SURVEY
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District 3 and 4 (containing)
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indicate a complete absence of trees.

There may have been blackjack areas that were entirely destitute of trees in pre-settlement times, but the contemporary evidence, as opposed to the tradition, indicates that trees were present, but scattered, in many blackjack localities.

The dry savannas apparently occurred where there had been excessive burning or on sites that were excessively dry or rocky. Bartram's allusions to "gravelly, dry, barren summits," and "tops of the barren grassy hills," as well as similar references by other authors leave the impression that the forest cover on the steeper interfluvial ridges was quite thin. Such areas were perhaps limited in extent, but the terms "desert plains" and "poor savannahs" suggest larger areas of similar nature. Not all dry savannas gave the appearance of sterility, however.

Beverley said that at the heads of the rivers in Virginia, that is, at the fall line, were "large spots of meadows and savannahs, wherein are hundreds of acres without any tree at all, but yields reeds and grass of incredible height." Apparently he was referring to upland.⁷³ Lawson passed through several rich, dry savannas that he described as great copses, many acres in extent of nothing but blackberry bushes. The day before reaching the Saponi village on Yadkin River, Lawson:

73. Beverley, op. cit., Bk. II, p. 8

74. Lawson, op. cit., pp. 23, 43, 52.

... areas that were entirely dead-
... the vegetation was
... to the condition, indicated that these were
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... the vegetation apparently occurred where there had been ex-
... burning or on sites that were excessively dry or rocky.
... to "gravelly, dry, barren trunks," and "dry
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... of steeper slopes of steeper nature. Not all dry
... of sterility, however.
... that at the base of the ridges in Virginia,
... were "large spots of nodules and
... the hundreds of acres without any trace of life,
... and grass of incredible height." Apparently he
... to explain. Lawson passed through several rich,
... that he described as great crops, many acres in
... out of the forest. The dry forest road-

...traveled about twenty five miles over a pleasant Savannah Ground, high and dry, and having very few trees upon it, and those standing at a great distance; the Land free from Grubs and Underwood. A Man near Sapona [sic] may more easily clear ten Acres, than in some Places he can one.

Between the Deep and Haw Rivers Lawson camped in another savanna having few trees, and near several outcrops of rock.⁷⁴ It is possible that this last savanna may have been on blackjack land, for there is some of this class of land in the vicinity.

Old settlers' tales, no doubt magnified by the passage of years, corroborate Lawson's description of the savanna west of the Yadkin River. According to William Henry Foote, extensive tracts between the Yadkin and Catawba, containing forests in 1846, were at an earlier date covered with tall grass with scarcely a bush or shrub in view.⁷⁵ One section of Rowan County was said to have been so barren in 1750 when settled that logs for the cabin had to be hauled nearly a mile, and the high land between Third and Fourth Creeks in Iredell County were said to have been open prairies covered with grass and wild pea vine.⁷⁶

75. William Henry Foote, Sketches of North Carolina Historical and Biographical (Dunn, N. C., 1912; original edition New York, 1846), p. 189.

76. Jethro Rumple, A History of Rowan County, North Carolina (Salisbury, N. C., 1881), pp. 5-6.

Chapter II

PIONEER AGRICULTURE IN THE SOUTHERN PIEDMONT

Summary

Pioneer agriculture, as the term is used in this study, embraced the operations of raising cattle on the range, the initial clearing and cultivation of the soil, the establishment of homesteads, and the search for a staple crop. The tide of settlement in the Southern Piedmont flowed from northeast to southwest, claiming Virginia and the Carolinas in the period 1740-1775, eastern Georgia from the Savannah to the Oconee between 1770 and 1790, and the remainder of Georgia between 1800 and 1825.¹ In Virginia at the northeastern end, and in western Georgia at the southwestern end

1. Frederick Jackson Turner, The Frontier in American History (New York, 1920), pp. 67-125. This discusses the racial groups settling in the Southern Piedmont and some aspects of the economic and political history of the movement.

the pioneer period was relatively short, for adjacent older regions had established the precedent for raising staple crops of tobacco and cotton, respectively. In the intervening areas a rather long period of experimentation was necessary before a staple was found. This pioneer period in the agricultural history of the region is important from the standpoint of soil depletion because in it habits of wasteful cultivation were formed that remained fixed almost to the present time.

In colonial times, and down to the early nineteenth century, the Piedmont was remote from the centers of commerce. Separated from the coastal settlements by the barren sand hills, its water transportation hindered by the numerous falls and shoals at and above the fall line, and its overland transportation made difficult by muddy clay roads, it received most of its settlers from the northeast--Pennsylvania and Virginia. The region was forced to be largely self-sufficient, and to make a profit above mere subsistence it was necessary to export commodities that bore a high unit value in relation to the costs of production and transportation. Extensive methods, involving the exploitation of the virgin richness of the region, with comparatively small expenditures of capital and labor, were necessary in order to produce such commodities. The most profitable exports of the Southern Piedmont were at first products of the Indian trade, such as deerskins, or cattle and hogs which fed upon the native forage and could transport themselves to market.

To support the range livestock industry the region afforded an

The pioneer period was relatively short, for adjacent older regions had established the precedent for raising the crops of tobacco and cotton. In the latter part of the pioneer period of experimentation was necessary before a staple was found. This pioneer period in the agricultural history of the region is marked by the fact that the first successful attempts to raise tobacco and cotton were made in the latter part of the pioneer period almost to the present time.

In colonial times, and down to the early nineteenth century, the principal staple was tobacco. The tobacco industry was the principal source of wealth in the region, and it was the principal industry in the region. The tobacco industry was the principal source of wealth in the region, and it was the principal industry in the region. The tobacco industry was the principal source of wealth in the region, and it was the principal industry in the region.

Transportation hindered by the numerous falls and shoals at and above the fall line, and its overland transportation was difficult. It received most of its settlement from the north and west, and it was a great source of wealth. It was necessary to erect commodities that were a high value in relation to the costs of production and transportation. Involving the exploitation of the virgin resources of the region, with comparatively small expenditures of capital and labor, were necessary in order to produce commodities. The most profitable exports of the southern plantation were at first products of the Indian trade, such as

original growth of wild peas and beans, beggarweeds, lespedezas, cane, and some small grasses. The mild winters made it possible for the stock to remain outside throughout the year. The herds roamed through the woods and were rounded up at the cowpens only for branding or in preparation for the drive to market. The lack of attention given the stock caused them to degenerate, and the cattle became infected with tick fever. After the virgin range had declined because of overgrazing, fire, and cultivation, it was replaced by harsh grasses unsuitable for good grazing, and the introduction of pasture and meadow plants from the northeast was not successful on a large scale. Although the livestock industry declined after the pioneer era it set a pattern of law and custom that remained for nearly a century longer. The countryside remained legally open range, the cultivator being required to cut down much timber to fence his crops against livestock, and the animals being allowed to roam about with little care.

As white population increased, corn, wheat, vegetables, hemp, flax, and cotton were produced for subsistence purposes and most of these articles were also supplied to the cities on the coast. Domestic industries flourished. Tobacco was found to be a profitable staple, and was produced widely from Virginia to Georgia from the end of the Revolution to about 1800. In the 1790's, with the invention of the cotton gin, cotton was found to fulfill the necessary conditions for a profitable staple in the southern part of the region even better than tobacco. North and west of the climate range for cotton production, tobacco continued to be the staple.

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The colonies and later states provided for granting of land by headright. The settler was allowed so many acres for himself and so many for each dependent. Most of the population was made up of independent small farmers who had secured their grants in this way. Men of wealth and influence, however, were able to secure large tracts which they let out to tenants for a share of the products or exploited by overseers employing servants or slaves. The land laws were often abused by the small squatter or the great land speculator. In Georgia after the Revolution these abuses led to the adoption of the lottery as a means of disposing land to actual settlers. Although most of the region was pioneered by small farm owners, the institutions of absenteeism, share tenancy, and managership became part of the pattern of pioneer settlement.

It was believed that the most fertile land was in the stream bottoms and that the least fertile was on the dry, level inter-stream divides. Plants which were commonly supposed to indicate fertile land were therefore the ones that grew on more humid sites, such as cane, walnut, hickory, and yellow poplar, and poor land was thought to be indicated by chestnut, pine, and post oak, which grew on the drier sites. However, because the bottom lands in the Piedmont were narrow and subject to overflow, the bottoms of the major streams and their principal tributaries were often neglected in favor of land along the smaller creeks. The first settlements were thus likely to be near, rather than directly on the larger streams. This meant that in many cases the first land to be taken up was the most rolling and the most exposed to

erosion. Other soils not greatly esteemed by the first settlers were the more poorly drained types of "blackjack" lands having impervious plastic clay subsoils, and the slate belt soils.

The pioneer fields were made by following the Indian practice of girdling the trees to kill them and planting the corn and peas among the trunks. Small grains were not usually planted until several years after. With the light shovel plow it was possible to do little more than scratch the surface. It was customary to cross plow, or "check". On land with sloping surface the shallow plowing and the straight rows of the last check plowing, as often as not running up and down the slope, caused the rains to sweep off the top soil rapidly. After the field had become gullied or the yields had begun to decline because of depletion of the surface humus, it was abandoned for a fresh field.

The amount of land eroded and abandoned on account of poor tillage during the pioneer period must have been considerable, but since land was abundant the farmers themselves do not seem to have considered erosion due to tillage an important problem. It remained for strangers travelling through the Piedmont near the turn of the nineteenth century to note that the rivers had become discolored during floods, that the soil washed more than in adjacent regions, that the settlers were forced to clear new fields frequently because the old ones "wore out", and that partly for this reason, the population was restless and many people moved westward beyond the mountains or southward to Georgia. The inhabitants themselves were, however, becoming concerned with the losses to soil and vegetation caused by woods fires. About the

time of the Revolution legislation was enacted in an attempt to prevent fires.

The Range Livestock Industry

The raising of livestock on the open range was an old pursuit in the Coastal Plain of all the southern colonies and it preceded or accompanied settlement in the Piedmont. There were cowpen keepers, whose main business was cattle tending, as well as regular pioneer farmers who maintained herds as a side line. The cow men allowed their herds to roam the woods throughout the year, only rounding them up at the cowpens in the spring to brand the calves. From time to time the cattle were driven to market in the coastal towns or points in the north. Many animals strayed away and became the progenitors of wild herds. Wild horses, cattle, and hogs were hunted by the early settlers just as they would hunt deer, bear, or buffalo. The pioneer farmer fed his stock not primarily to nourish them, but to teach them to return to the farmstead.

To the pioneer farmer, his herds of half-domesticated animals were so important that they often determined the location of his settlement. About 1775 a well-to-do settler near Augusta, Ga., wrote that newcomers took up land at a distance from possible neighbors so that stock would have a great extent of public land to graze upon. As the country became more thickly peopled the stock raisers took up additional grants to the westward to accommodate their large herds. This particular settler had a grant of

State of the Territory, and the fact that the
Territory is now a part of the United States.

The House of Representatives

The raising of livestock on the open range was an old practice in the Territory. The early settlers, who were mostly of English descent, had brought with them the knowledge of raising livestock. They had also brought with them the knowledge of the open range. The early settlers, who were mostly of English descent, had brought with them the knowledge of raising livestock. They had also brought with them the knowledge of the open range. The early settlers, who were mostly of English descent, had brought with them the knowledge of raising livestock. They had also brought with them the knowledge of the open range.

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6,340 acres, less than 200 acres of it being in cultivation, 440 head of cattle, and 300 head of hogs. He reported that some men owned as many as 1,000 head of cattle.²

Livestock raising, in one respect, was favored over the cultivation of crops by colonial legislation. Each colony had laws requiring the cultivator to fence his fields against trespass by livestock. Typical requirements were that the fence must be from 5 to 6 feet in height with the rails close together at the bottom, that if the fence met these specifications and was in good repair the cultivator was entitled to recover damages from the stockman from trespass by the latter's animals, that if the fence did not meet the requirements the cultivator could not collect damages, and that in suits arising under the fence law a committee of three disinterested freeholders was to determine if the fence was "sufficient" and the extent of damage done.³ The worm fence made of rails was most often used, but occasionally this was supplemented by a ditch.

In the eyes of the settlers there were two conditions favoring the range livestock industry. The open stand of the forest and the occurrence of savannas allowed a rather prolific growth of herbaceous plants. The mild climate made it possible to keep

2. Anon., American Husbandry (London, 1775), v. 2, pp. 14-29.

3. Georgia, The Colonial Records of the State of Georgia, compiled by Allen D. Candler (Atlanta, 1904), v. 18, pp. 73-74; South Carolina, The Statutes at Large of South Carolina, edited by Thomas Cooper and David J. McCord (Columbia, 1836), v. 2, p. 81.

... of its being in a position, ... head of cattle. He reported that some ... head of cattle.

Investigation ... in the ...

... of cattle by colonial legislation. ... the cultivator to fence his fields against trespass by livestock. Typical requirements were that the fence must be ... the cultivator was entitled to recover damages from the stockman ... the latter's animals, that if the fence did not ... the cultivator could not collect damages.

... under the fence law a committee of ... was to determine if the fence was ... the extent of damage done. The fence was made of ... but occasionally this was supplemented by a wire.

In the case of the settlers there were two conditions ... livestock industry. The open range of the ... of savannah allowed a rather profitable growth of ... The mild climate made it possible to ...

... of the ...

... of the ...

livestock without housing them in winter.

It is evident from eighteenth century descriptions that most of the range forage consisted of legumes. There are many references to wild pea vines, and other references to wild beans and vetch. As noted in the preceding chapter, Hawkins and Byrd referred to the wild legumes and Rumple recorded traditions of them. Catesby informs us that in the mountainous country near the headwaters of the Savannah River, in a forest consisting mainly of chestnut and small oak trees, the ground was covered with a thin stand of grass mixed with vetch and wild peas.⁴ Other writers referred to a plant called buffalo clover, "a species of grass much like red clover not much coveted by any cattle except the Buffalow [sic]."⁵

The Indians cultivated many kinds of peas and beans. According to Beverley they were all kidney-shaped, and some of the same species were to be found growing wild. He seemed to think that the natives had adopted their culture in Virginia.⁶ The practice of agriculture among the Indians was brought in from the south or west, having probably originated in the lands of the Caribbean and South America. It is more likely, therefore, that the wild

4. Catesby, Natural History of Carolina, v. 2, pp. iv-v.

5. "Journals of His Excellency Governor Tryon's Escort from Salisbury to the Western Frontiers of the Province to meet the Cherokee Indians," in Colonial Rec. N. C., v. 7, pp. 1003-1008. See also Reuter, "Wachau, or Dobbs Parish," in Moravian Records, v. 2, p. 565.

6. Beverley, Hist. of Va., bk. 2, pp. 29-30.

11-12-1911. (1911) (1911) (1911)

It is evident from the following that the

of the large range consisted of jagged. There are many water-

courses in this range and many of them are of considerable

volume. As soon as the mountains are reached, the water

level is low and the water is very shallow.

Locally known as first in the mountainous country near the foot-

water of the Hawaiian River, in a forest consisting mainly of

chestnut and small oak trees, the ground was covered with a thin

stand of grass mixed with vetch and wild peas. Other species of

grass were also present in small patches.

The soil was not much covered by any organic matter.

The forest consisted mainly of trees and shrubs. Second-

ary in the forest they were all kidney-shaped, and some of the same

species were to be found growing wild. It seemed to think that

the natives had brought them from the mountains.

It is difficult to say among the Indians was brought in from the south or

west, but it is probably from the south.

and South America. It is more likely, therefore, that the wild

1. (1911) (1911) (1911) (1911) (1911) (1911) (1911) (1911)

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counterparts of cultivated legumes had escaped from the Indian fields. Christian Gottlieb Reuter, the surveyor for the Moravians in North Carolina, also listed Indian beans as growing abundantly in the woods of Wachovia. He said that they resembled garden beans and that cattle, horses, and sheep ate them eagerly.⁷

During his trip along the Savannah River, Bartram noticed that:

the rich humid lands in the vales bordering on creeks and bases of the hills...produce... of herbaceae a vast variety and abundance, as...Phaseolus [wild bean or wild pea?], Tripsacum [gama-grass],...[and] Glycine apios [ground nut or wild bean (*Apios Americana* Medick)].⁸

Probably representatives of the two genera of legumes named in this quotation, as well as of other genera such as Lathyrus were blanketed under the convenient term "wild pea vines" by the less scientific of the early writers.

Other legumes that probably furnished some nourishment to the herds of cattle and hogs, although not noticed so much by writers as the wild peas and beans, were the tickclovers or beggarweeds (Desmodium spp.) and the native lespedezas. Some lespedezas had been described by earlier botanists, but Andre Michaux developed the classification still further and gave the genus its present name. He named it in honor of D. Lespedez, the governor of Spanish Florida, who aided the botanist during the latter's excursions in North America in the last years of the eighteenth

7.Reuter, "Wachau," Moravian Records, v. 2, p. 568.

8.Bartram, Travels, pp. 318-319.

century. Michaux found four species, all in the southeastern States from Virginia to Georgia.⁹

The potentially valuable type of plant thus made known was neglected for another half century, until the accidental introduction of the Japan clover again called attention to it. Neglect of all forage resources was, of course, characteristic of the staple crop economy of this period, but aside from this, native lespedezas had certain disadvantages. They probably made up only a small proportion of the herbaceous ground cover. Pure stands are difficult to obtain and the native species are not as prolific as their introduced oriental cousins.¹⁰

Livestock turned out to shift for themselves at all seasons required some kind of forage that would live throughout the winter. Few native legumes met this need, but it was partially filled by the native cane. The Indian traders learned to rely upon the cane in the stream valleys to feed their pack horses in winter, but as Byrd testified, even this was not enough for horses constantly on the trail.¹¹

Spangenburg paid tribute to the utility of the cane as pasture for stock in winter time. He sought out tracts with cane and other grasses to support the cattle of the Moravians for the

9. Andreas Michaux, Flora Boreali-Americana, Sistens Characteres Plantarum (Paris, 1803), v. 2, pp. 70-71.

10. A. J. Pieters, "The Native American Lespedezas," Soil Conservation, v. 4 (Sept. 1938), pp. 84-86.

11. Byrd, Histories, pp. 232 et seq.

first few years. He made it clear, however, that grazing the cattle on cane was to be only a temporary arrangement until regular meadows could be laid down. The bishop was somewhat contemptuous of the laziness and poor farming of the native North Carolinians and was not sanguine of the prospects of many new settlers. Many Irish immigrants were drawn into the colony because they had heard that it was not necessary to feed stock in winter. Spangenburg was certain that if they acted on this assumption their cattle would be greatly injured.

The Moravians brought grass seed from Pennsylvania with them and laid out meadows soon after their arrival. Nevertheless they must have acquired the habit of allowing the stock to graze on the range much of the time, for 11 years after the first settlement it was said that the cane was becoming somewhat less plentiful because of the many cattle in Wachovia. At this time (1764) Reuter listed red and white clover among the wild plants of Wachovia. Perhaps they were escapes from the meadows of the Moravians or some other group of settlers. The cultivated meadow plants were said to be "English grass" (which included a mixture of introduced grasses and clovers) and caraway.¹²

The region was rather poor in native grasses other than cane. Judging from Bartram's description, quoted above, the natural meadows along the streams were composed to some extent of gama-grass. This species was subsequently tried a number of times for

¹². Moravian Records, v. 1, pp. 40-41, 45-47, 58, 59, 73-140; v. 2, pp. 564, 568, 573-574.

hay and pasture use, but its value was never established. Reuter said that "wild corn or rye" was to be found along the creeks in the Moravian settlement. It was a native grass of some importance as stock feed in the Northeast and the Ohio Valley, but apparently its distribution in the South was limited. The most prevalent grass was the broomsedge, but of course it was not a forage plant of any great utility. Newcomers were sometimes delighted that "fine grass" upon which they hoped to graze their cattle came up readily in the old fields, but they were doomed to disappointment. The grass was of little value, and anyway it was succeeded in a few years by trees. According to American Husbandry:

It is not here as in the northern colonies, that weeds come first and then grass; the climate is so hot, that, except on the rich moist lands, any sort of grass is scarce; but the fallow in a few years becomes a forest,...If [the] planter does not return to cultivate the land again...it presently becomes such a wood as the rest of the country is; and woods are here the pasture of the cattle, which is excellent for hogs, because they get quantities of mast and fruit; but for cattle is much inferior to pastures and meadows.¹³

The Moravians probably conducted the most extensive attempts made to improve meadows and pastures in the pioneer era, but other isolated instances were also recorded. In 1768 a certain Captain Barringer was said to have had meadow land producing excellent hay in Mecklenburg County, North Carolina.¹⁴ At the

13. American Husbandry, v. 1, pp. 340-341; v. 2, p. 22; John D. Mitchell, The Present State of Great Britain in North America (London, 1767), p. 153.

14. "Governor Tryon's Journal," in Colonial Records of N. C., v. 7, p. 825.

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... but for cattle is much inferior to pasture

... to improve meadows and pastures in the pioneer era, but
... Benjamin Baringer was said to have had meadow land producing ex-

... in Colonial Records of N. C.
... 1771

beginning of the nineteenth century the adjacent districts of York, Lancaster, and Chester in South Carolina had some improved meadows of red clover and introduced grasses.¹⁵ Such instances were exceptions to the general practice, for the average pioneer farmer was content to exploit the pasture laid down by nature.

As a result of the large number of animals kept, there was over-grazing and range depletion. As noted above, Reuter of the Moravian settlement hinted that depletion was about to begin there. In 1766, two years after Reuter wrote, the North Carolina Assembly prohibited inhabitants of South Carolina from maintaining cattle in the northern colony unless they owned land there at the rate of 100 acres for every 10 head of livestock. The reason given for this law was that cattle owned by South Carolinians were of late years destroying the range and injuring the "poor Inhabitants" of North Carolina.¹⁶ The law indicates that forage depletion was a problem and that one animal per 10 acres was considered the approximate carrying capacity of the range. In more recent times the carrying capacity of unimproved woodland pasture in the South has averaged about 20 acres per animal unit. The carrying capacity of improved pastures, on the other hand, has been 2 to 3 acres per animal unit.¹⁷ There appears to have been

15. John Drayton, A View of South Carolina as Respects her Natural and Civil Concerns (Charleston, 1802), pp. 142-143.

16. Complete Revisal of the Acts of the Assembly of the Province of North Carolina (Newbern, 1773), p. 353.

17. C. V. Piper et al, "Our Forage Resources," in U.S.D.A., Agriculture Yearbook, 1923 (Washington, 1924), p. 389. The volumes of this series before 1937 are cited hereafter as Agriculture Yearbook, [date].

[illegible]

a decline in the productivity of the open range, from colonial times to the present, but in the Southern Piedmont this was probably not as great as indicated by the statistics, for they take into account the "piney woods" of the Coastal Plain, much of which has been poor cattle range from the time of settlement, whereas the amount of range land in the Piedmont has been greatly reduced by cultivation.

The apparent ease with which cattle could be raised in colonial times was deceptive. Several travelers agreed with Spangenburg about the harmful effects upon animals of the range method of raising cattle. It was pointed out that the woods pastures were not sufficient to keep the livestock in good condition all winter, that although the winters were open, periods of freezing weather occurred often enough to cause harm, that no attention was given to improving the breeds, and that the cattle became infested with ticks. F. A. Michaux, son of the man who named lespedeza, said that all this resulted in animals that could in no way be compared with English cattle. The cows were dry most of the year. These defects were greatest in the Coastal Plain, but were to be found also in the Piedmont. Near New York and Philadelphia, on the other hand, the cattle were as fine as those of England because better care was taken of them, according to Michaux.¹⁸

18. F. A. Michaux, Travels to the West of the Alleghany Mountains ...and back to Charleston by the Upper Carolines [sic], in Early Western Travels, 1748-1846, edited by Reuben Gold Thwaites (Cleveland, 1904-1907), v. 3, pp. 298-300; American Husbandry, v. 1, pp. 459-460.

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Livestock keepers in the South Atlantic colonies and those familiar with the business recognized the great obstacles presented by cattle ticks on the one hand and various kinds of "distemper" on the other, but they did not suspect the connection between one kind of tick and one kind of distemper now known as tick fever, or Texas fever. White settlers continued and intensified the Indian practice of woods burning not only to secure a fresh supply of forage in the spring, but also to kill the ticks lodged in the undergrowth.¹⁹ Legislation was enacted to prevent the driving of fever-infected cattle northward, and an outbreak of the disease among Pennsylvania cattle in 1796 caused by a herd from South Carolina was described scientifically, but it remained for modern investigators to determine the exact cause of Texas fever and to bring about its near extirpation.²⁰ Outside observers placed most of the blame for poor livestock upon neglect by the owners, but perhaps the fever should share some of it.

The natural obstacles to the development of livestock industries beyond the pioneer stage in the Southern Piedmont were rather formidable. The animal industries of western Europe were developing in a cool, moist climate requiring close attention to the animals and favoring the growth of a certain assemblage of nutritious hay and pasture plants. The warmer climate and the

19. Dobbs to Board of Trade, Newbern, N. C., Aug. 24, 1755, Colonial Records of N. C., v. 5, p. 354.

20. D. E. Salmon, "Some Examples of the Development of Knowledge Concerning Animals Diseases," in Agriculture Yearbook, 1899, pp. 124-125.

The first step in the investigation was to determine the location of the vessel. The vessel was located in the vicinity of the bridge. The vessel was then boarded and the crew was interviewed. The crew members reported that the vessel was carrying a large quantity of goods. The goods were then loaded onto the vessel and the vessel was then allowed to depart. The vessel was then located in the vicinity of the bridge. The vessel was then boarded and the crew was interviewed. The crew members reported that the vessel was carrying a large quantity of goods. The goods were then loaded onto the vessel and the vessel was then allowed to depart.

The natural resources in the development of livestock industry beyond the pioneer stage in the Southern Piedmont were

18. In the event of a change of ownership, the company shall be bound to the same terms and conditions as the original owner.

[illegible]

different flora of the Southeast were strange to the western Europeans. They were deceived into the mistaken idea that attention to the animals in winter could be relaxed. Once they had destroyed the succulent native growth by overgrazing or by cultivation they found that it was replaced not by good forage plants but by harsh grasses, shrubs, and pine trees. They also found that their European cattle became infected with tick fever, an indirect result of the climate. Red and white clover of European origin would grow more readily in the Piedmont than in the Coastal Plain. Tick infestation apparently was less widespread in the Piedmont also. On the other hand, compared with the northeastern regions the Southern Piedmont was at a disadvantage, for it could not compete with them in the production of most introduced forage plants and it was near enough to the centers of tick infestation to be greatly affected.

Economic developments were of even greater importance in determining the position assumed by livestock industries. The growth of cities in the Northeast encouraged dairying and haymaking, which in turn stimulated meadow and pasture improvement. In the Southern Piedmont tobacco and cotton production were found to yield the largest profits, resulting in a neglect of livestock and grasslands. The techniques of raising cattle and hogs remained about the same from the middle of the eighteenth until near the end of the nineteenth century.

If there had been as much profit in intensive livestock raising in the Southern Piedmont as in the northeast and a corresponding lack of competition from staple crops it is quite

...the end of the nineteenth century.

possible that suitable forage plants would have been found or developed, and that systematic attempts to breed tick-and heat-resistant cattle from African or Oriental types would have been undertaken long before they were. Carrier has pointed out that eastern North America, especially the Southeast, lacked native forage plants suitable for cultivation.²¹ He fails to stress the importance of legumes in the native flora, however. They are significant not only because they supported the range stock, after a fashion, for 75 years or more, but also because they indicated the types of plants (i.e., Oriental lespedezas, cowpeas, etc.) that would eventually be developed for forage. It was not as easy to develop cultivated forage plants for the Southeast as for the Northeast, but modern research has shown that it can be done.

The Landholding System

In the colonial period land in the Southern Piedmont was granted to the individual by the respective colonial governments acting for the King, or by the proprietor in the case of the Granville property in North Carolina. After 1776 grants were made by the States. All of the land except that west of the Oconee River in Georgia was granted by the system of headrights or by outright sale. The territory west of the Oconee was

21. Carrier, Beginnings of American Agri., pp. 26-29.

distributed by lottery by the State of Georgia.

In theory the headright was an agreement whereby the individual would settle and improve a tract of land and in return receive a specified number of acres for himself and a specified acreage for each of his dependents. The settler was usually supposed to pay certain fees for surveying and recording the grant and in the colonial period a given amount per acre per year as quitrent. This system underwent numerous modifications and was often abused or entirely disregarded in practice. Persons of wealth or influence in England or the older parts of the colonies acquired huge blocks of land which they neither saw nor attempted to develop, but held merely for speculative purposes. At the opposite end of the economic scale were pioneers with but few worldly possessions who squatted upon crown or proprietary lands for many years without taking out grants or paying quitrents. There were many large grantees who were both able and willing to settle families of servants, slaves, or tenants upon their holdings. Apparently more typical, however, were the numerous moderately well-to-do immigrants who settled and secured grants of medium size with a minimum violation of the regulations. By the time the Piedmont of Virginia and the Carolinas was settled the more glaring defects in the system of granting land in those colonies had been mitigated somewhat.

In 1755 when the interior of North Carolina was receiving a swarm of immigrants from the northward it was recommended that grants of any amount of land up to 640 acres be made to persons able to improve them. This was partly to accommodate wealthy persons with large herds of cattle, but the flexibility of the regulation

The first of these was the fact that the land was not
 owned by the State but by the people. The second was
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also provided for the poor settler who did not want the full amount of land. Governor Dobbs of North Carolina reported that the lax methods of surveying land and giving away huge tracts were not as prevalent as formerly. It was no longer customary for the surveyor to inquire of the settler requiring the general features of a proposed grant and then "at the fireside" draw out a plat based on this information and the surveyor's imagination, leaving the settler to mark his own lines and take up as much land as he pleased. This type of survey, or lack of survey, had been practiced in the Coastal Plain because the swampy areas bordering the rivers were difficult to penetrate and the pine barrens were not worth the trouble to survey in detail; in the Piedmont the greater value of the land and greater density of population seems to have encouraged more accuracy.²²

Gross abuse of the land laws continued in Georgia until after the Revolution. Here the settler was allowed to have 200 acres for himself and 50 acres for each dependent, but the total grant to any one person was not to exceed 1,000 acres. Nevertheless grants of as much as 100,000 acres were made to some individuals. The scandals caused by the Yazoo land companies were of national scope, but the excesses within the organized parts of Georgia, that is, the territory east of the Oconee, were also great. From about 1788 to 1796, three and one-half times as much land as was to be found within this territory was granted away. Chastened by

22. Colonial Records of N. C., v. 5, pp. 149-150, 361-362, 395.

[illegible]

this experience, the people of Georgia changed their method of disposing of public land.

The headright system resulted in a crazy-quilt pattern of land holdings. The first arrivals in an area had their lines run to suit themselves. Later settlers either took up land adjoining the first grants or went a short distance away where they too could run independent lines. The last to arrive filled in the blank spaces on the map with grants that sometimes had peculiar shapes indeed. Several decades passed before all the land in a locality passed into private ownership. The grants for the northwest corner of Fairfield County, S. C., referred to in Chapter I. covering 8,768 acres were made over a period of 34 years, and even they do not represent all the land in the area. The public survey and lottery system adopted in Georgia after 1803, on the other hand, provided a checkerboard pattern of holdings. The square lots and groupings of lots into rectangular districts made a relatively permanent framework of boundaries. The ground plan is still to be seen in the layout of roads in parts of Georgia.

Tenancy, managership, and related methods of working absentee-owned land, were woven into the frontier pattern at a very early time. It was logical that land magnates who were expanding their holdings to distant frontiers where they could not be in person, and where labor was scarce, should adopt such a system. According to Bruce, about one-third of the stockholders in the Virginia company entitled to land in the colony sent representatives to make settlements for them rather than come to the New World themselves in the years following the first establishment

The first settlement in the area was made in 1878, when a group of men from the United States Army, who were stationed at Fort Huachuca, decided to settle in the area. They built a small settlement, which was later named Fort Huachuca. The settlement was built on a hill, and the men who lived there were called the "Fort Huachuca men". The settlement was built in a very strategic location, and it was one of the first settlements in the area. The settlement was built in a very strategic location, and it was one of the first settlements in the area. The settlement was built in a very strategic location, and it was one of the first settlements in the area.

at Jamestown.²³ In 1733, a tenant paying one-half the produce as rent worked a new estate near the juncture of the Dan and Staunton Rivers adjoining Byrd's tract, and Byrd, himself, had an overseer. He complained of the poor management of both the tenant and his own "first minister." The most westerly settler on the south side of Dan River was a tenant or overseer, whom Byrd found to be less objectionable than the other two men.²⁴

In the North Carolina Coastal Plain, it was customary for the owners of large tracts to furnish emigrants with the land, food, tools, negro slaves, work animals, and cattle in return for the work of clearing and planting and the payment of one-third of the crops and one-third of the increase of the livestock. The tenant was also allowed to sell all the tar, turpentine, and staves that he made. This afforded an opportunity for many poor settlers to get a start toward land ownership.²⁵

In a society in which it was easy for men of wealth or influence to secure princely domains of virgin land which they were not able to manage in person, tenants and overseers fulfilled a useful function. Their numbers may have been small in comparison with the independent farmers, but their services in pioneering were probably as great in proportion to their numbers as were

23. Philip Alexander Bruce, Economic History of Virginia in the Seventeenth Century (New York, 2nd ed., 1935), v. 1, p. 504.

24. Journey to the Land of Eden, pp. 105, 117-119.

25. Anon. (Scotus Americanus), "Informations Concerning the Province of North Carolina, 1773," N. C. Hist. Rev., v. 3, no. 4 (Oct. 1926), pp. 598-621

those of the independent farmers. They established farmsteads, produced crops, tended livestock, and kept properties in running order for absentee employers, and although the employers might complain of their negligence and poor management, it is questionable if the independent farmers or the great land owners themselves with forces of slaves did much better. Abundance of land and corresponding scarcity of labor discouraged conservative land use by all classes of farmers.

Local Factors Determining Settlement

In selecting places for settlement consideration was given to lines of communication, proximity of neighbors, topography, drainage, kind of soil, and native vegetation. From the standpoint of resulting soil erosion the last four of these factors were of most importance.

Generally the earliest settlers of the Piedmont avoided locations directly on the main rivers such as the Roanoke, Catawba, or the Savannah, and quite often they avoided the principal secondary rivers. These streams were likely to have only narrow bottoms and short, steep slopes leading to the uplands. Even when the bottoms were wide they were subject to destructive flooding. The most prized locations were the bottoms that were free from destructive overflow and where the ascent to the upland was not too steep. These were to be found sometimes where a secondary stream joined a main one, but more often on the creeks and smaller branches tributary to the secondary stream. This meant

and corresponding amount of time. The amount of time is not to be less than the amount of time for the same work, and the amount of time is not to be more than the amount of time for the same work.

The following places for settlement consideration were given:
1. Proximity of communication, proximity of neighbors, topography,
2. Kind of soil, and native vegetation. From the above
list of resulting soil erosion the last four of these factors
were of most importance.

Generally the erosion occurred in the following places:
1. Along directly on the left bank of the river, the erosion
in the channel, and quite often they avoided the principal ero-
sion scars. These streams were likely to have only narrow
bottoms and steep, bare sides, and in the channel, the
erosion was more severe than the erosion on the sides of the
channel. The most serious erosion was the erosion on the
left bank of the river and where the recent to the right was
not so severe. The erosion in the channel was more severe
on the left bank, a main one, but more often on the right and
tributary to the secondary stream. The main

that although locations fronting the main rivers were not desired, the principal early settlements were not far away from them. These are the conclusions reached by Meriwether from his detailed study of the settlement of South Carolina.²⁶ They appear to hold good for the Southern Piedmont as a whole.

Byrd observed with regret that rich lowlands even on the smaller streams were likely to be overflowed periodically, causing the pioneer farmer to seek higher lands that were "just tolerable" in preference to richer bottoms where he risked destruction of crops and livestock.²⁷ The Moravians chose their tract of Wachovia in the Muddy Creek watershed, near but not directly upon the Yadkin River, because it contained the largest body of rich, comparatively level unpatented land that they had seen in North Carolina.²⁸

Evidently the interfluvial divides between main streams, such as those located between the Broad and the Catawba or between the Saluda and the Enoree were not taken up until after the lands nearer the rivers with more generous amounts of creek bottom were settled. Likewise, of course, the more rugged hills, such as those of the North Carolina slate belt, were avoided.

Old Indian fields were among the first lands to be taken up. It was believed by some settlers that the Indians tilled only on

26. Robert L. Meriwether, The Expansion of South Carolina, 1729-1765 (Kingsport, Tenn., 1940), p. 163.

27. Journey to the Land of Eden, p. 115.

28. Spangenburg, "Diary," Moravian Records, v. 1.

that although locations fronting the main rivers were not de-

sired, the principal early settlements were not far away from

them. These and the settlements located in the interior

settled away of the settlement of South Carolina. They ap-

pear to have been good for the Southern element as a whole.

They were with regret that rich lands even on the

smaller rivers were likely to be overlooked periodically, some-

times the pioneer farmer to seek higher lands that were "more impor-

tant" in preference to richer bottoms where he raised destination

at once and forever. The settlements were not far from the

main river in the early years, but as the settlements grew

the main river, because it contained the largest body of water,

was naturally the most important land that they had seen in North

Carolina.

Obviously the interfluvial divides between main streams, and

as these lay between the Broad and the Ogeechee or between the

Ogeechee and the Savannah were not taken up until after the Indian

war. The river was the main source of water for the

settlement. Likewise, of course, the more rugged hills, such as

those of the North Carolina state belt, were avoided.

The Indian fields were among the first lands to be taken up.

It was believed by some settlers that the Indians killed only at

the river, and the settlements were not far from the

main river in the early years, but as the settlements grew

the main river, because it contained the largest body of water,

was naturally the most important land that they had seen in North

the best land, but this may have been merely a rationalization from the fact that it was unnecessary to clear recently abandoned Indian fields.²⁹

It has been said in the first chapter that tradition in South Carolina named the so-called blackjack lands as the sites of many beginning settlements. Merivether, on the contrary, believes that the settlers sought first the lands with red, sandy clay subsoil, such as the Cecil sandy loam, but avoided both the slate soils and the blackjack soils if a choice was to be had.³⁰ It is true, as he points out, that blackjack soils are difficult to work. These, or the related Davidson clay loam, are sometimes called "push land" because they adhere to the plow when damp instead of scouring off in a clean slice. The low, poorly drained blackjacks certainly presented obstacles to the settler with his light wooden plow, and were doubtless avoided or quickly abandoned. On the other hand, the virgin topsoil of all series and types was more friable and contained more humus than the surface of the present more or less truncated soil profiles. In undulating, well-drained land there was probably not much difference in response of the topsoil to the plow from one soil series to another when first cleared.

The greatest influence of soil type in determining location of settlement was indirect, that is, through the vegetation the

29. Hugh Jones, The Present State of Virginia, pp. 9-10.

30. Merivether, op. cit., p. 163.

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It has been said in the first chapter that throughout the world
the most common type of settlement is the village or hamlet.
In the United States, however, the most common type of settlement is the city or town.

...the ...
...as the ...
...the ...

called "wash land" because they adhere to the place when damp in-

light women flow, and were doubtless avoided or quickly absorbed.

...the present more or less truncated wall profiles. In under-

...of the forest to the low one soil series to ...

I mentioned was indirect, that is, through the vegetation the

soil supported. Whereas contemporary writings on the kind of soil most desirable for settlement are very meager, there is a considerable body of information on plants that were considered indicators of good soil. Cane was believed to indicate a first-class soil, as were walnut, hickory, black oak, yellow poplar, and "sugar tree." Poor land was thought to be indicated by chestnut, pine, post oak, and blackjack oak. There were writers and settlers who disagreed with this general classification. Reuter said that the "reeds," or cane, grew only in the poorest bottoms in Wachovia. He, likewise, thought that white oak indicated poor soil, although some pioneers believed that it grew in fertile soil.³¹ In Georgia, in 1802, land supporting hickory, dogwood, and oak, which appeared as the best to one observer, was not accounted by others as valuable as gray land supporting pine, with hickory and oak as secondary trees.³²

Plant indicators, of course, had a relationship to the topography and to the moisture content of the soil. Cane and most of the supposed rich-land trees would be found on the lowlands, or other more humid sites, whereas pine, chestnut, and to some extent white oak, would be more likely to grow on dry upland sites. Blackjack oak would be found on poorly drained soils.

Following the Revolution Georgia adopted a rather complicated

31. John H. Logan, A History of the Upper Country of South Carolina (Charleston and Columbia, 1859), pp. 10-11.

32. A. D. Alexander to Maj. E. Read, Montpelier [sic], Ga., May 11, 1802, N. F. Cabell MSS, Virginia State Library, Richmond, Va.

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 and writers who disagreed with this general statement.
 writer said that the "poor" or "bad" tree was the
 bottom in Kentucky. He, however, thought that the
 called poor soil, although some writers believed that it was a
 fertile soil. In Kentucky, in 1807, land was reported to be
 good, and was also reported to be bad in the same year, and
 was reported to be as fertile as the best of the best of the
 with black oak and as rich as the best of the best.
 This indicates, of course, that a writer might be the type
 story and to the various kinds of the soil. Cane and oak
 of the opposite kind - one would be found in the best of
 or other soil, black oak, chestnut, pine, and so on.
 extent this soil would be very fertile in some of the best
 also. Blackjack oak would be found on poorly drained soils.
 Following the American Revolution a writer mentioned

W. L. R. Jones, A History of the River Valley of the Ohio
 The University of Kentucky Press, 1911, pp. 12-13.
 W. L. R. Jones, A History of the River Valley of the Ohio
 The University of Kentucky Press, 1911, pp. 12-13.
 W. L. R. Jones, A History of the River Valley of the Ohio
 The University of Kentucky Press, 1911, pp. 12-13.

classification of land for taxation purposes based upon native vegetation and proximity to bodies of water. In the Piedmont, land bordering the Savannah, Oconee, and Ogeechee Rivers, were given the higher evaluations in the order named. Land bordering the principal tributaries of the Savannah and "all other oak and hickory land in the state" came next. The smallest evaluation was given to "all other pine land throughout the state."³³ The classification appears to have taken into account supposed fertility as such, and the actual or potential development of transportation on the rivers.

The net effect of all factors influencing settlement location was to concentrate the pioneer establishments upon creeks near, but not directly upon the rivers, in land that was undulating. The settler might prefer stream bottoms, but because of the narrowness of the bottoms in the Piedmont and the danger of flood he had to engross a large proportion of rolling upland in his grant and before long had to begin tilling the rolling lands. This does not mean that the river flood plains and the level interfluvial ridges were entirely neglected. Bottom land soil was so rich that it continued to tempt farmers. On the other hand, as the country became more thickly populated men pushed up to the heads of the creeks and out on to the flat-topped interfluvial divides. The location of main roads and, in many instances, county courthouses, on the divides also drew population.

³³. Colonial Records of Ga., v. 19, pt. 2, pp. 399-403.

Crops and Tillage Practices of the Pioneer Period

Two factors conditioned agriculture in the Piedmont in the period before the coming of the railroads. One was the remoteness of the region from markets. Fairly dependable navigation was possible only in the Coastal Plain, where the rivers were wide and slow-flowing. Above the break in navigation at the fall zone small boats plied from time to time, but no large regular traffic could be carried on because of the many bars and rapids, the steep gradient of the streams, and the fluctuations in stage. Wagon roads were more important than the streams, but the clay subsoil rendered them almost impassable in wet weather, especially since the prevailing type of wagon had a narrow wheel tread that cut deeply.³⁴ Prolonged wet periods were, of course, more frequent in winter at the very time when crops were taken to market.³⁵

The other factor was the necessity for the farmer to produce a surplus of commodities that could be sold for cash. The impression is widely held that the colonial backwoods farmer lived to a

³⁴The ruts in the clay roads were worn so deeply that John Drayton, governor of South Carolina, wished for a law requiring the use of wider wheels on the freight wagons, but he realized that a law so contrary to general custom would be difficult to enforce. See Drayton, op. cit., p. 141.

³⁵For discussions of the transportation problems see: Ulrich Bonnell Phillips, The History of Transportation in the Eastern Cotton Belt to 1860 (New York, 1908); C. C. Crittenden, The Commerce of North Carolina, 1763-1789 (New Haven, 1936).

great extent upon a subsistence level, but this is erroneous, as Hacker has well pointed out.³⁶ The farmer operated in a money economy, and cash was necessary to meet certain expenses, even if he had not displayed the normal human desire to make a profit. Furthermore, colonial legislatures, the home government, and merchants in colonial and British ports, all acting upon the prevailing mercantilist philosophy, encouraged the production of raw materials that would enter into world trade and bring money to the mother country. Circumstances may have forced the pioneer to be self-sufficing for a time, but in most cases he did not remain so from choice.

In a remote territory where the population was sparse and composed largely of small farmers, the most readily adopted staples were those that were non-perishable, had a high enough unit value to bear the cost of transportation, did not require a large force of laborers or elaborate machinery in preparation for market, and --a factor of even greater importance in its relation to soil erosion--gave a reasonable yield without recourse to intensive husbandry. Many crops were tried. By a process of elimination two, tobacco and cotton, were found that met all the requirements most successfully.

Until the choice of these two was finally made the surplus products of the Piedmont region were quite varied. Livestock and livestock products, among the first surpluses, have already been

³⁶. Louis M. Hacker, The Triumph of American Capitalism (New York, 1940), pp. 118-120.

[illegible]

is a small country where the population was sparse and com-
posed largely of well known, the very small number of
were those that were non-perishable, had a high enough unit value
to pay the cost of transportation, did not require a large force
of laborers or animals, and was in general, for the most part,
-- a factor of very great importance in the history of the
country--and a valuable yield without recourse to intensive
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discussed. Hemp, flax and flaxseed, indigo, wheat products, and corn were produced for export in considerable quantities, and corn and vegetables were supplied to towns and rice plantations along the coast. Vines, silk, and madder were also experimented with, but were found not suited to local conditions or were produced only for home consumption. Charleston, the trade outlet for much of the interior of both Carolinas, received 3,000 wagons per year laden with these products and fruits of the chase, especially deer skins.³⁷

Within the limitations imposed by the geographic and economic setting, tobacco became the most profitable staple for the mass of the farmers. For the entire Southern Piedmont the period of greatest tobacco production was from the end of the Revolution to about 1800. After that time the tobacco area was confined to Virginia and adjacent parts of North Carolina as cotton began to claim its kingdom to the southward.

The process of establishing a pioneer farm has been well described by many writers, but there are certain features about it that deserve emphasis in connection with a historical study of soil erosion.³⁸ Having chosen a site for his farmstead the

37. Lieutenant Governor William Bull to the Earl of Hillsborough, June 7, 1770, "Public Records of South Carolina," MSS, South Carolina Historical Commission, Columbia, S. C., v. 32, p. 283; Gov. William Tryon to Board of Trade, Jan. 30, 1767, Colonial Records of N. C., v. 7, p. 429.

38. See for instance, C. O. Sauer, "The Settlement of the Humid East," in Climate and Man, Yearbook of Agriculture, 1941 (Washington, 1941), pp. 160-161.

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ordinated by many nations, but there are certain features about it
that have been emphasized in connection with a historical study of
the subject. Having chosen a letter for his language, the

pioneer set about to build a shelter or cabin and clear a field. It was necessary to fell some timber for the dwelling, for rail fences around the field, and to clear a large enough space to free the dwelling from the danger of falling trees during storms. The additional land needed was secured by the Indian practice of girdling the trees, taking a strip of bark 2 or 3 feet wide from the entire circumference of the trunk. These were the principal operations in clearing the land if, as was so often the case, the forest was free from underbrush. In a few years more trees were girdled for another field and the dead trees in the first field were cut, burned, or allowed to rot and blow down, the stumps remaining in the field for many years.

Corn and beans were planted together in hills among the stumps and girdled trees. Some settlers followed the Indian practice still further by stirring the ground only in these hills, but not elsewhere in the field. Hoe culture such as this, however, was confined mainly to the Coastal Plain; most Piedmont farmers had plows with which to break up the entire surface. The shovel plow, a light, one-horse instrument without mouldboard that penetrated to a depth of only a few inches, was the plow in general use. The lack of close-rooted undergrowth and the looseness of virgin topsoil made plowing comparatively easy even for this light plow. One set of furrows was laid off in one direction and another set laid off crossing the first at right angles. Corn and bean hills were placed at selected intersections of the furrows. The same "checks" were maintained in cultivating, although the hoe might assist the plow in this operation.

The shallow plowing and cultivation, while it destroyed the surface litter, did not furnish a deep enough tilth to absorb rainwater. In addition, on sloping fields the last set of furrows laid off was likely to run down hill, thus furnishing a good set of soil and water conductors in times of storm. On the other hand, for several years after the first clearing, while there still remained some forest litter on or near the surface and before the tree roots and stumps had completely decayed, the fields had some protection from erosion. If the farmer was well-equipped with laborers, tools, and draft animals he might do a cleaner job of field clearing by "grubbing" up the stumps completely, thus becoming a more efficient agent in accelerating soil erosion. By the end of the eighteenth century better farmers were beginning to use heavier mouldboard plows. Deeper tilth was secured by these plows, but the custom of check plowing still prevailed.³⁹

Corn and the several kinds of native peas were probably the first crops planted in most instances, but there was quite a variety of other products raised in the course of a few years. These included wheat, barley, rye, oats, millet, potatoes, pumpkins, turnips, squash, peaches, apples, cotton, and the other

³⁹.Dobbs to Board of Trade, Aug. 24, 1755, Colonial Records of N. C., v. 5, pp. 353-364; American Husbandry, v. 2, p. 21; Drayton, op. cit., pp. 137, 140-142; N. F. Cabell, Early History of Agriculture in Virginia (Washington, n. d.), pp. 11-12; Thomas Moore, The Great Error in American Agriculture Exposed: and Hints for Improvement Suggested (Baltimore, 1801), passim.

more strictly cash crops discussed above. Since the small grains required finer tilth for the seedbed than the pioneer was able or willing to give the first year, corn and pea culture served to prepare the land for them. In some instances, corn was produced on the newly cleared field until yields began to decline, then it was sown in peas and beans for a year, then in wheat for several years. Finally it was considered exhausted and was abandoned to be reclaimed by native vegetation.⁴⁰ After corn was gathered in the fall, wheat was, in many cases, sown on the corn stubble land and the seed plowed under. This covering of the seed was the only preparation of the soil for wheat.⁴¹

For the first 3 or 4 years after clearing, the yields of corn ranged from about 35 bushels to 60 bushels per acre. Peas brought from 25 bushels to 50 bushels to the acre. After several years yields began to decline. Wheat yields averaged from 12 to 15 bushels per acre, although more careful tillers secured from 20 to 40 bushels. Barley and oats gave about the same yield. The author of American Husbandry marvelled that yields, greater in some instances than those from more intensive culture in England, could be procured, but he realized that they were due to the freshness of the soil rather than to any great effort on the part of the farmer.⁴² At the beginning of the nineteenth century the

⁴⁰.American Husbandry, v. 1, pp. 339-341.

⁴¹.Drayton, op. cit., p. 139.

⁴².American Husbandry, v. 1, pp. 263-264; v. 2, p. 21.

poor tillage given wheat land and the low yields were justified on the grounds that to produce any more would be useless because the surplus would not be worth transporting any great distance.⁴³

Indigo and tobacco were produced on fresh, well-drained upland. Virginia colonists had learned in the seventeenth century to depend upon virgin soil for tobacco cultivation, and the search for new lands was one reason for bringing Virginia tobacco cultivators into the Southern Piedmont. Newly cleared fields would bear tobacco for 3 or 4 years before declining yields set in. After that, especially in Virginia, the planter devoting most of his energies to tobacco production might remove westward to new lands, selling the entire plantation to small farmers for grain production. A change having the same effect might take place without change of ownership, the operator devoting a virgin field first to tobacco, then to corn or wheat before finally abandoning it, meanwhile clearing a fresh field for his tobacco.⁴⁴

Carolina indigo producers pursued a similar course. The preferred indigo land was "a rich, light, black mould, such as [was] commonly found in the back country," although most indigo was produced in the lower parts of the provinces where such soil was limited. Indigo was planted in fresh land for several years, then the same land was devoted to corn or wheat, and finally to barley. In its soil requirements, hemp was complementary to

⁴³. Drayton, op. cit., p. 139.

⁴⁴. Jones, The Present State of Virginia, p. 39; American Husbandry, v. 1, p. 262.

the surplus would not be worth manufacturing and hence it is as the Government that it produce any more would be useless because have almost exhausted them and the United States Government.

1964. Virginia separates the counties in the Shenandoah Valley from the counties in the Piedmont and the Tidewater. The counties in the Shenandoah Valley are the counties in the Shenandoah Valley.

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After that, especially in Virginia, the planter devoted

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The above information was obtained from the files of the FBI, New York Office, dated 10-18-67.

copy. In the full transcript, page was designated as

indigo and tobacco, being raised on stiff low grounds or drained marshes. Farms containing both upland and lowland were thus in a position to practice a diversified agriculture, raising more than one crop for export.⁴⁵

Soil erosion on the upland fields of tobacco and indigo was probably an important reason for the prevalent belief that these two crops were very exhausting. There is reason to believe that much of the erosion damage on steep slopes near the Savannah River in Georgia dates from the pioneer period when tobacco was cultivated on these slopes.⁴⁶

The Beginning and Spread of Soil Erosion

References to soil erosion were very meager in the literature about the Southern Piedmont before the end of the eighteenth century. It is accordingly impossible to trace in detail the beginnings of erosion and the relation of its incidence to settlement. Obviously there was soil washing on rolling or hilly cultivated fields, but land was plentiful and the first settlers do not seem to have been greatly concerned about its abuse. As the following quotations indicate, erosion was not confined to cultivated lands.

⁴⁵.American Husbandry, v. 2, p. 24.

⁴⁶.Information from Mr. Glenn L. Fuller, formerly Regional Chief of Conservation Surveys, Soil Conservation Service, Spartanburg, S. C.

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...
... for export.

... on the upland fields of tobacco and ...
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The Beginning and Spread of Soil Erosion

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Governor Dobbs of North Carolina, writing in 1755 of his lands in the Rocky River watershed in the present Cabarras County, where 75 families of Germans and Scotch Irish had settled some 8 years previously, said:

All these high hills which they [the settlers] call barren, and won't take are excellent for vines, with which they are over-spread but burnt down yearly, that few are left to bear grapes, the whole soil a rich red loaming soil intermixed with marchasites and spar, and after every thundershower the earth washed away leaves, a black shining sand like pounded lead ore, or iron with particles of Spar and here are symptoms of rich mines,...⁴⁷

As noted in the second chapter, Dobbs believed that the fertile topsoil of the sand hills region had been burned off by woods fires, and in the above quotation he seems to refer to soil washing more as a result of fire on the hilly land than of cultivation. In 1777 and 1782 the State Assembly of North Carolina passed laws to prevent excessive woods burning. The act of 1777 declared that:

...the frequent burning of the woods is found to be destructive to cattle and hogs, extremely prejudicial to the soil, and oftentimes of fatal consequences to planters and farmers, by destroying their fences and other improvements.⁴⁸

According to Byrd and other writers, woods burning around settlements was more frequent than beyond the frontier. It is evident that the burning of underbrush and surface litter, exposing the

⁴⁷.Dobbs to Board of Trade, Aug. 24, 1755, Colonial Records of N. C., v. 5, p. 356.

⁴⁸.Public Acts of the General Assembly of North Carolina, revised by Francois-Xavier Martin (Newbern, 1804), v. 1, pp. 246-247, 318.

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soil to washing, and destroying livestock food together with the other dangers from fire, had become a cause for concern when the loss of soil due to tillage was not yet felt.

By the last three decades of the eighteenth century the Piedmont soils were beginning to show the effects of use and abuse on a rather wide scale, and many restless pioneers were ready to be off to virgin regions. It was also beginning to be noted that because of the inherent characteristics of the soil and because of the uneven surface, there were definite limitations to agricultural possibilities in the region under existing methods of culture.

According to one observer the James River above Richmond resembled a "torrent of blood" during a flood in 1779.⁴⁹ This indicates that erosion was rather widespread in the upper James watershed, embracing portions of the Piedmont as well as lands lying west of the Blue Ridge. In 1796 Isaac Weld found that the Pennsylvania Germans who had recently settled near Fincastle, in the Valley, would not take up land to the east of the Blue Ridge because the red soil there was different from what they were used to and because it was injured by the mountain torrents. Weld noted that west of the Blue Ridge the brown mould would produce a rich meadow of white clover spontaneously, whereas on the red soil to the east of the mountains it was difficult to secure grassland because the rains swept away both the seed and the

49.[Anburey, T.], Travels Through the Interior Parts of America, in a Series of Letters, by an Officer (New Edition, London, 1791), v. 2, p. 360.

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It was also beginning to show the effects of the war and many restless pioneers were beginning to move west to virgin regions. It was also beginning to be noted that because of the inherent characteristics of the soil and because of the heavy surface, there were definite limits to the amount of land that could be cultivated.

According to one observer the James River flows through
a "torrent of blood" during a flood in 1773. This
indication that erosion was rather widespread in the upper James
basin, however, is not confirmed by the fact that the
river was in the Blue Ridge. In 1773 James held found that the
James River valley was the only valley in the Blue Ridge
the valley, would not take up land to the east of the Blue Ridge
because the red soil there was different from that they were used
to and because it was injured by the mountain currents. While
most of the rest of the Blue Ridge the river would have found
a bed made of white clay or sand, whereas on the red
soil in the east of the mountain it was only the
James River valley the river would have found a bed

soil.⁵⁰

Farther south another traveller, La Rochefoucault Liancourt, observed about the same time that:

The population of Upper Carolina is not numerous and the emigration from that country is not inconsiderable. It is for this reason that the best land only ... is cultivated ... This order of things will continue, as long as the population shall not obtain more considerable additions, and a period be put to the emigration of the inhabitants. This restlessness of disposition prevails here as much among the planters, as it does in Georgia ... They frequently quit their small tract before it is completely cleared, and remove farther into the forest, where, less surrounded by planters, they can live more to their taste ... Instances of planters continuing long in the same place where they first settled are more rare here, than in Pennsylvania. They generally emigrate from South Carolina to Tennessee, Kentucky, and the western countries, but some remove also to the back part of Georgia.⁵¹

The younger Michaux wrote in 1802 that the uplands in the Piedmont were considered of inferior value; and that cultivators of these uplands were forced to clear new fields repeatedly, with the result that many migrated westward.⁵² It was claimed by some observers that clearing in the upper country had caused unprecedented floods in the Santee River between 1784 and 1796, destroying the indigo industry along the river's lower course.

50. Isaac Weld, Travels Through the States of North America, and the Provinces of Upper and Lower Canada, During the Years 1795, 1796 and 1797 (4th edition, London, 1807), v. 1, pp. 214-216.

51. François Alexandre Frédéric, duc de La Rochefoucault Liancourt, Travels Through the United States of America, the Country of the Iroquois, and Upper Canada, in the Years 1795, 1796 and 1797 (London, 1799), v. 2, pp. 496-497.

52. F. A. Michaux, loc. cit., v. 3, p. 297.

The floods abated after 1796. Other observers pointed to this fact as proof that the floods had not been caused by clearing, since the continued spread of cultivation after 1796 had not caused a recurrence of the freshets.⁵³

53. David Ramsay, Ramsay's History of South Carolina, From its First Settlement in 1670 to the Year 1808 (Newberry, S. C., 1858), v. 2, pp. 292-293.

The United States is a country of immigrants. It is a country of people who have come from all over the world to build a better life for themselves and for their children. It is a country of people who have brought with them their own customs, languages, and religions, and who have blended them into a new American way of life. It is a country of people who have made great contributions to the arts, sciences, and industry of the world.

The United States is a country of freedom. It is a country where every person has the right to life, liberty, and the pursuit of happiness. It is a country where every person has the right to speak their mind, to worship their God, and to live their life as they see fit. It is a country where every person has the right to work for a living, to own property, and to enjoy the fruits of the earth. It is a country where every person has the right to be treated with dignity and respect.

The United States is a country of hope. It is a country where every person has the chance to start a new life, to become a citizen, and to make a difference in the world. It is a country where every person has the chance to achieve their dreams and to live a life of purpose and meaning.

Chapter III

THE TOBACCO AND MIXED FARMING AREA, 1800-1860

Summary

The area of tobacco cultivation in the Southern Piedmont contracted sharply during the Napoleonic Wars because of the decline in the tobacco market, an increased European demand for American wheat, and the greater profitableness of cotton culture in the southern and eastern parts of the region. The Piedmont now became divided into two large crop areas, the Tobacco and Mixed Farming Area to the northeast and the Cotton Area to the Southwest, and these divisions have persisted with relatively minor change to the present day. Within the Tobacco and Mixed Farming Area there was greater concentration on tobacco in Virginia and the northern tier of North Carolina counties; on the eastern fringe of the region in both states, mixed cultivation of tobacco and cotton was practiced; and general farming, with only secondary attention to either of the great staples, was to be

THE CIGARETTE AND THE TOBACCO INDUSTRY IN THE UNITED STATES

INTRODUCTION

The cigarette industry in the United States is one of the most important and rapidly growing industries in the country. It is an industry that has grown from a small, local business into a large, national enterprise. The cigarette industry is a major source of revenue for the federal government, and it is also a major employer of labor. The industry is a complex one, involving the cultivation of tobacco, the processing of the leaves, and the manufacturing of the cigarettes. The industry is also a highly competitive one, with many companies vying for market share. The cigarette industry is a fascinating one, and it is one that has captured the imagination of the American people. It is an industry that has grown from a small, local business into a large, national enterprise. The cigarette industry is a major source of revenue for the federal government, and it is also a major employer of labor. The industry is a complex one, involving the cultivation of tobacco, the processing of the leaves, and the manufacturing of the cigarettes. The industry is also a highly competitive one, with many companies vying for market share. The cigarette industry is a fascinating one, and it is one that has captured the imagination of the American people.

found through central North Carolina. Stagnation of the tobacco market continued almost uninterrupted until after 1830 and mixed farming was practiced even in the areas where greatest attention was devoted to tobacco.

Between 1830 and 1860 there was a revival of the tobacco trade. The building of canals and railways and the beginning of the local manufacture of tobacco improved the economic condition of the area, furnishing a home market for the staple and enabling the eastern tobacco belt to compete successfully with Kentucky and Tennessee.

As new lands were opened to the west and southwest, emigration from the area increased, reaching a climax in the third and fourth decades of the nineteenth century. Between 1830 and 1840 there was an absolute decline in the rural population. The rate of migration was greatest from the Virginia counties in the north-eastern part of the area, where land holdings were large. Migration tended to consolidate land holdings here. In the 1840's and 1850's, after prosperity had returned, the rate of emigration declined.

Hard times and emigration stimulated public inquiry into the possible causes for the difficulties and discussion of remedies. Improved transportation was hailed as one method of combating depression. Reform in agricultural practices was also advocated. However, the reform movement quickening the agricultural community in northern Virginia, Maryland, and elsewhere did not touch this part of the Southern Piedmont to any great extent until the 1830's, when the influence of Edmund Ruffin and his Farmers'

... almost unintermitted until after 1850 and since
... to tobacco.

Between 1850 and 1860 there was a revival of the tobacco
... the fatal manufacture of tobacco deepened the economic condition
... the system tobacco belt to compete successfully with Kentucky

... were opened to the west and southwest, and
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Register began to be felt. Complaints about soil erosion, "exhaustion," land abandonment, and primitive methods of cultivating now became more frequent. County and state agricultural societies, devoted to spreading knowledge of improved practices and holding exhibits of prize products, flourished. State agricultural and geological surveys were also established to seek out the resources of the states and furnish information for their better exploitation. In the last two decades the complaints of erosion and exhaustion were less frequent, but much remained to be done toward improving farming practices. The reform movement was individualistic. It reached only the gentlemen farmers with the capital, leisure, and inclination to experiment, but it had little influence on the mass of the small farmers.

In colonial times tobacco had been produced mainly on virgin land. When the original fertility of the field had been depleted, or when it had begun to erode, after about the fourth year, it was planted to corn or some other grain crop. During the first half of the nineteenth century, as virgin tobacco land became scarce, the best fields of the farm were selected for permanent tobacco lots and these were highly manured each year. Other improvements included the rotation of tobacco with wheat, corn, and clover, the laying out of tobacco hills on the contour, and in some cases, the fertilization of the tobacco lots with guano, plaster, or commercial fertilizers. The building of railroads at about the same time that Peruvian guano and manufactured fertilizers were first introduced made possible a much wider use of fertilizing materials than had been possible under the previous

system of home making of barn yard compost.

The dark, heavy types of tobacco for export prevalent at the time were raised first on virgin soil of nearly any kind and later on upland clay loams or heavier sandy loams that were manured. Domestic manufacturers at length preferred tobacco of lighter color and thinner leaf when it was discovered that the gray sandy loam or sandy upland soils of the Piedmont, naturally low in organic matter, would produce the lighter type. Previous to this the bottom lands of the major streams, and the middle slopes and rolling uplands near the secondary streams had been the most valuable land. The crops and soil of the bottoms were periodically injured by overflow, and a great deal of the rolling upland had been damaged by erosion. The level interfluvial divides where most of the gray sandy soil was located had, however, remained the least in demand. Gradually, increase in population and perhaps erosion on the other soil types on the lower part of the slopes caused more of the gray uplands to be put in cultivation. The great demand for bright tobacco later caused the price of the gray lands to increase rapidly.

Tobacco planters in general devoted insufficient time to other crops. Colonial methods of cultivating corn and the small grains persisted, but toward the end of the period improvements in the management of these crops kept pace with improvements in tobacco management. Contour cultivation, deep plowing with heavy two or four horse plows, and fertilization with barnyard manure, guano, and gypsum were practiced on the more progressive farms. The use of guano on wheat became quite common. The counties on the James

[illegible]

River in Virginia and the central counties of North Carolina were the most important producers of wheat.

General Development, 1800-1860

Tobacco had become an important staple crop in the Southern Piedmont from Virginia to Georgia by the end of the Revolution, although the region remained one of diversified agriculture and home industries. The depression in tobacco during the Napoleonic Wars, the corresponding European demand for American wheat, the abandonment of tobacco production in tidewater and northern Virginia, and the introduction of commercial cotton culture in the more southerly areas of the Piedmont restricted the tobacco area and brought about alignments in the crop regions that have persisted, with only small modifications, to the present day. In Virginia, tobacco production had become localized in the Piedmont, both north and south of the James River, by the last decade of the eighteenth century.

The two northern tiers of North Carolina counties turned increasingly to tobacco culture and their crops were marketed in Virginia and formed an inseparable part of the Virginia crop. Richmond, Petersburg, and Norfolk, which remained the trade centers for interior Virginia and northern North Carolina, became the principal tobacco ports, replacing the former tobacco ports of northern Virginia. Still farther south, in central North Carolina, lay the trade divide between the regions tributary to the Virginia ports and those tributary to Charleston or Fayetteville

and Wilmington. After commercial cotton cultivation became established in the South Carolina uplands in the opening decades of the nineteenth century this divide formed a zone of transition between the cotton-producing areas to the south and the tobacco area to the north. This zone was rather broad and fluctuating. Either cotton or tobacco or both were produced here, depending upon the state, or supposed state, of the market. Being rather far from markets, either north, south, or east, this zone concentrated rather heavily on self-sufficient general farming.

The first three decades of the nineteenth century were, on the whole, not prosperous ones for the tobacco farmers of the Piedmont. The long war period, during which the foreign trade in tobacco stagnated, was followed very closely by business depression and by increasing competition from tobacco regions west of the Alleghenies. Only about 1833 did a semblance of prosperity return to the tobacco districts of Virginia and North Carolina. These conditions were reflected in the generally low production of these years. The annual inspections in Virginia (which probably included most of the North Carolina crop) between 1817 and 1830 ranged from about 42 million to about 67 million pounds.

The region found a partial solution for its difficulties by a continuation of the diversified agriculture which had distinguished it in colonial times. The great stimulus to wheat production came during the Napoleonic wars, but after the War of 1812, and especially in the decade and one-half following the depression of 1819, wheat prices were below average and

production fell off. Cotton became a staple crop as well as one raised for home consumption. In 1791 it was almost as important in the Virginia Piedmont as tobacco and wheat, and by about 1818 between one and one-half to three million pounds were marketed in Petersburg annually from the areas along the Roanoke River.¹ Somewhat later there was a contraction of the area of culture, but on the eastern edge of the Piedmont in both states cotton had established a firm foothold and had replaced tobacco to some extent. In 1800 tobacco was the pioneer crop on newly cleared land here, but by 1828 corn was the first crop, followed in rotation by cotton and wheat. The raising of hogs became important in North Carolina, and hams and bacon, like tobacco, made the long overland journey to Petersburg from such interior points as Orange County. In this study the tobacco area, the area of mixed cotton and tobacco culture, and the area of transition have been combined into the "Tobacco and Mixed Farming Area".²

1. The mixed character of agriculture in Pittsylvania County, Virginia, later one of the great tobacco areas, in 1829 is indicated by the processing establishments of Danville. It boasted a flour mill, a saw mill, a grist mill, and under one roof, a linseed oil mill, cotton gin, and wool carding machine. A tobacco factory was also in operation about this time. (Edward Pollock, Sketch Book of Danville, Virginia, Its Manufactures and Commerce [Danville], 1885, p. 22.)

2. Joseph Clark Robert, The Tobacco Kingdom: Plantation, Market and Factory in Virginia and North Carolina, 1800-1860 (Durham, N. C., 1938), pp. 135-143; L. C. Gray, History of Agriculture in the Southern United States to 1860 (Washington, 1933), v. 2, pp. 910-914; Avery O. Craven, Soil Exhaustion as a Factor in the Agricultural History of Virginia and Maryland, 1608-1860, Ill. Univ. Studies Soc. Sci., v. 13, no. 1 (Urbana, 1925), p. 77; "Home Manufacturers in Virginia in 1791," William and Mary College Quart. Hist. Mag., n. s., v. 2 (April 1922), pp. 139-148;

...into the "Tobacco and Mixed Farming Area".

The Virginia-North Carolina Piedmont suffered also from another form of inter-regional competition: the migration of thousands of its farmers to the newer lands of the west and southwest. This competition operated in a vicious circle from the standpoint of the older districts, for the population lost to them enabled the new regions to compete more successfully in raising tobacco and cotton. By 1839 Kentucky, Tennessee, and Missouri raised as much tobacco as Virginia and North Carolina, of a quality that compared quite favorably with the product of the older states.

Under the stimulus of these adverse conditions, there was considerable discussion of the exhausting effects on the soil of the tobacco crop, and some of the more educated planters attempted to improve their farming practices. Such men as William Merivether of Amelia County, Virginia greatly curtailed or dispensed with tobacco cultivation altogether.³ However, the agricultural reform movement started at this time did not find many adherents south of the James River before about the third decade.

The period from 1830 to the Civil War, although marked by the depression of the early 1840's, was on the whole more prosperous

D. B. Warden, Statistical Political and Historical Account of the United States (Edinburg, 1819), v. 2, p. 22; Calvin Jones, "Answers to Some of the Queries Relating to Agriculture," American Farmer, 1st ser., v. 10 (Nov. 7, 1828), pp. 265-266; Cameron Papers, MSS, University of North Carolina Library, Chapel Hill, N. C. See especially 1809-1821.

3. North Carolina Board of Agriculture, Papers on Agricultural Subjects (Raleigh, N. C., 1827), pp. 33-34.

The following table shows the results of the investigation of the effect of the different factors on the growth of the different types of bacteria. The results are given in the following table:

[illegible]

the period from 1850 to the Civil War, although omitted by the

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for the tobacco districts than the preceding three decades. The condition of the tobacco districts was improved by construction of canals and railways and by the development in tobacco manufacturing within the districts, which furnished a home market to supplement the foreign trade.

The era of internal improvements in this region witnessed the building of the James River and Kanawha Canal, completed from Richmond to Lynchburg by 1840, lesser improvements on other rivers, and the construction of the basic railway net connecting the interior with the principal fall line and deep water markets such as Richmond, Petersburg, Norfolk, Raleigh, and Wilmington. The canals and railways not only greatly reduced the cost of bringing produce to market, but they made it possible for interior farmers to secure plaster of Paris, guano, and fertilizers for soil improvement.⁴ The cost of overland transportation of these materials for any distance had hitherto been prohibitive.

The optimistic outlook engendered by railway construction in the upper Roanoke valley was well expressed by James C. Bruce of Halifax County. Writing in 1833 he declared:

We have heretofore wanted an outlet to the ocean--tobacco has been our only crop, and we have experienced, to the fullest extent, all the evils attending its cultivation. Our lands are nearly exhausted, and we are now on the look out to discover some means of restoring their fertility... The wheat crop is becoming more profitable, as the facilities of market have increased very much since the construction of the Petersburg rail

⁴.Anon., "Agriculture in Virginia," Southern Planter, 1st ser., v. 1 (July 1841), p. 119.

For the purpose of showing the position of the river at the time of the construction of the bridge, a plan was prepared by the engineer in charge of the work, which is now in the possession of the State of New York. The plan shows the river at the time of the construction of the bridge, and the position of the bridge at the time of the construction of the bridge.

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road, and will be still more increased, when that from Portsmouth is completed. Manufacturing mills of improved construction, are being erected on our water courses, and we have every reason to believe, that wheat will be the great staple of the Valley of the Roanoke...⁵

The movement for internal improvements coincided with the beginnings of industrial development. The processing of tobacco was a principal feature of this development. In 1833 it was estimated that about half the tobacco inspected in Virginia was manufactured in that state, and by 1850 over two-thirds of the leaf grown in Virginia and North Carolina was processed locally. At first conducted in small rural establishments as adjuncts of the plantation or country store, by the time of the Civil War tobacco manufacturing was carried on chiefly by large concerns in Richmond, Petersburg, and Lynchburg. Smaller factories scattered throughout the tobacco districts remained important, however. Danville was the center of such an area of rural manufacture.⁶ The grain and flour trade revived somewhat in the early 1830's and Richmond became an important flour milling center and shipping port for the South American trade. In 1834 the capacity of mills in Richmond and vicinity was 500,000 barrels of flour per year.⁷ These mills drew mainly upon the wheat-producing districts of central Virginia and the Valley of Virginia. The Southern

5. James C. Bruce, "Horizontal Trenching to Prevent the Washing of Hilly Lands," Farmers' Register, v. 1. (Nov. 1833), pp. 334-335.

6. Robert, op. cit., pp. 161 ff.

7. Gray, op. cit., v. 2, p. 816.

1. The first of these is the fact that the Commission has not yet received any information from the Government of the United States regarding the activities of the Committee for the Liberation of the People of the East (CLPE) in the United States. The Commission is therefore unable to determine whether the CLPE is a legitimate organization or a subversive one.

[illegible]

Piedmont counties became more important wheat producers in the 1840's and 1850's than they had been previous to this time. Corn mills were to be found on streams throughout the Piedmont.

Several results flowed from these developments in transportation and industry:

(1) The area was not only able to meet western competition, but to expand tobacco production on the basis of the home market. Tobacco production increased from the 1831 crop of about 51 million pounds inspected in Virginia to that of 65 million pounds raised in the Tobacco and Mixed Farming Area in 1839. Influenced by the lower prices of the next decade, the annual production dropped to 55 million pounds in 1849, but rose to about 99 million in 1859, the greatest crop of the antebellum period. (See Table No. 1, Appendix II.)

(2) Marketing and processing were concentrated in a few towns on the margins of the Piedmont and these grew in relative importance. Richmond increased in population from 16,060 in 1830 to 37,910 in 1860. Petersburg's increase in this same period was from 8,322 to 18,266. Raleigh, although not an important tobacco town, more than doubled in population between 1840 and 1850, after its railroad connections with the Roanoke and Wilmington were completed.

(3) Better transportation facilities opened markets for other crops. Diversified agriculture with the aid of commercial manures was thus more profitable than formerly and made possible the adoption of soil-conserving practices. Wheat in particular benefited from better transportation. Production increased from

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(1) The area was not only able to meet western competition,
but to export tobacco production on the basis of the same market.
Tobacco production increased from the 1881 crop of about 11 million
pounds to 18 million pounds in 1891. In 1891, the annual production
of the United States was 18 million pounds, but rose to about 20 million
pounds in 1892, the greatest crop of the antebellum period. (See
Table No. 1, Appendix II.)

(2) Marketing and processing were concentrated in a few towns
on the western side of the Piedmont and there grew in relative importance.
Tobacco increased in population from 18,000 in 1880 to
27,000 in 1891. Petersburg's increase in this same period was
from 18,000 to 18,200. Raleigh, although not an important tobacco
town, was also doubled in population between 1880 and 1891.
Other tobacco towns, such as Greensboro and Winston-Salem,
also increased.

(3) Further processing of tobacco was concentrated in a few towns
on the western side of the Piedmont and there grew in relative importance.
Tobacco increased in population from 18,000 in 1880 to
27,000 in 1891. Petersburg's increase in this same period was
from 18,000 to 18,200. Raleigh, although not an important tobacco
town, was also doubled in population between 1880 and 1891.
Other tobacco towns, such as Greensboro and Winston-Salem,
also increased.

slightly over two million bushels in 1839 to over 4 1/2 million in 1859. In Halifax County, Virginia, for instance, the predictions of Bruce about the increased importance of the wheat crop came true. In 1839 its production was 78 thousand bushels but in 1849 the crop was about 147 thousand bushels.

(4) Migration was decreased somewhat because the opportunities for employment within the area were greater. This point is considered more at length in the following section.

(5) The domestic tobacco manufacturers developed a demand for the bright yellow tobacco such as could be produced on the light, infertile soils of the Piedmont, as opposed to the dark tobaccos which had gone into the foreign trade since colonial times. After the Civil War this circumstance revolutionized the tobacco industry.

Migration and Land Abandonment, 1800-1860

The emigration of many thousands of its residents to the newer regions of the west and southwest was a problem faced by the Tobacco and Mixed Farming Area throughout the period from the Revolution to the Civil War. This movement of population varied in intensity from time to time and affected some localities more than others. The total rural population of the area, that is, the population outside of towns of 2,500 or more, increased from 305,272 in 1790 to 576,682 in 1860. The decade ending in 1830 was the one having the smallest increase, and there was an actual decrease in the decade ending in 1840. It appears,

[illegible]

then, that the flow of population from the farms of the area reached its greatest intensity during these two decades. (See Appendix No. II, Table No. 5)

Most affected by the migration were some of the Virginia counties in the northern part of the area. Ten of these counties had reached the peak of their antebellum rural population growth by 1830 or earlier, and these counties experienced a smaller percentage of growth between 1790 and 1860 than any others in the entire Southern Piedmont. (See Appendix No. III, Maps No. 3 and 4.)⁸ In general, these counties contained large farms by 1860, and a high percentage of the population was slave. Apparently migration from these counties had been accompanied by the process of farm consolidation typical of the older plantation areas. Much of the land had been cleared and was in cultivation by 1850, the date of the first census of land use, and reserves of fresh land were small. (Compare Maps No. 3, 4 and 5.)

Most of the southwestern Virginia Piedmont counties and the North Carolina counties, on the other hand, experienced continuous or irregular growth up to the time of the Civil War. In some cases the percentage of increase in rural population in the period 1790-1860 was almost 200 percent. In these districts the farms generally remained smaller and the slave population formed a smaller proportion of the whole in 1860 than in the Virginia areas

8. For an explanation of the maps and the population and agricultural data see Appendices No. II and III.

that the flow of population from the farms of the area

would be greatly increased by the construction of the

Virginia R.R. (See Appendix No. II, Table No. 1)

that affected by the migration were some of the Virginia

population in the northern part of the area. Ten of these counties

had reached the peak of their antebellum rural population growth

by 1850 or earlier, and their population was declining at the

beginning of 1900. (See Appendix No. III, Table No. 2 and

4.) In general, these counties had been in the process of

and a high percentage of the population had been in the

migration from these counties had been recommended by the process

of farm population typical of the other plantation areas.

Some of the land had been cleared and was in cultivation by 1850.

The state of the first census of land use, and reserves of land

land were small. (See Appendix No. IV, Table No. 1)

that of the migration Virginia R.R. (See Appendix No. II, Table No. 1)

South Carolina counties, on the other hand, experienced a

and a high percentage of the population had been in the process

of migration from these counties had been recommended by the process

of farm population typical of the other plantation areas.

Some of the land had been cleared and was in cultivation by 1850.

The state of the first census of land use, and reserves of land

land were small. (See Appendix No. IV, Table No. 1)

that of the migration Virginia R.R. (See Appendix No. II, Table No. 1)

discussed above. Even the counties where growth was greatest, however, contributed a share to the movement westward.

The period 1820-1830, when growth in the tobacco Piedmont was less than average, was in general one of stagnation and depression, whereas the great migrations of the 1830's occurred during a period of relative prosperity in the tobacco districts. During both decades, on the other hand, there were western land booms. The 1820-1830 decade witnessed the opening of parts of middle Georgia and Alabama and Mississippi to settlement, and great expansion in cotton cultivation in those areas. Between 1830 and 1840 the remaining Indian lands of Georgia, Alabama, and Mississippi were opened to settlement and the two latter of these states became the chief cotton producers. Easy money encouraged a rapid increase in the sale of western lands, ended abruptly by the panic of 1837. In short, the attractions of new lands and new opportunities operated both in good times and in bad. As one settler in Illinois wrote to his kin in Davidson County, North Carolina:

One hand can rais from 1200 to 1500 bushels of corn an thare he cant rais mutch more than one hundred and it look like it is the easyest kind to tend they have everytthing hear that you have thar an in a heap convanenter way.⁹

The stay-at-home, viewing with alarm the outflow of friends, relatives, customers, and potential customers, was prone to

9.B. H. Frank to Alexander Frank, Brown Co., Ill., Nov. 21, 1857, Alexander Frank Papers, Duke University Library, Durham, N. C.

Even the countries where growth was fastest,

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With thanks to the staff at the University of the Pacific, Honolulu, Hawaii, for their assistance in the field.

and, therefore, of approximately the same size.

...in cotton cultivation in those areas.

[illegible]

The subject was viewing with alarm the outflow of refugees.

and potential customers, was going to

attribute it to some defect in the old home--a defect which, when remedied, would supposedly bring a halt to the emigration. The early advocates of canals and river improvements urged that these would draw trade to local markets and stop the loss of population. In 1819, for instance, Archibald D. Murphy complained that in the preceding 30 years the resources of North Carolina had been neglected while half a million persons had left the state to people the west, and he attributed the distress of that year very largely to the "scattered condition of our commerce, and the want of a home market."¹⁰

The exodus of the 1830's made a profound impression on contemporaries. By this time virgin land in Virginia and North Carolina was becoming less plentiful and sentiment for more conservative farming practices was growing. Observers were quick to connect emigration with the wearing out of the land. Near the beginning of the decade one of them wrote: "... the scratching farmer's cares and anxieties are only relieved by his land soon washing away. As that goes down the rivers he goes over the mountains."¹¹ Another reformer of Cumberland County, Virginia declared:

10.[Archibald D. Murphy], Memoir on the Internal Improvements Contemplated by the Legislature of North-Carolina: and on the Resources and Finances of the State (Raleigh, 1819), pp. 5-6.

11.Anon., "On Ploughing," by De Rustica, Amer. Farmer, v. 13 (1831), pp. 25-26.

... lands naturally the best in the world have become worn and exhausted by the culture of tobacco. The bitter weed has laid the forest low and left us with nothing but galls and gullies and dwarf pine. Our ridges have become so barren, that they do not afford cover for the partridges and they have followed the soil down branches and creeks, hovering in the flats. [Virginia's] forest has been swept away and her great men of genius and worth, together with the hard cultivators of the soil, the bone and sinew of the land, have, by thousand and tens of thousands, been driven out of the state, in search of better lands.¹²

In December 1835 the Norfolk Beacon, in an issue devoted to internal improvement, lamented that over 1000 negroes had been taken south from Pittsylvania county in the preceding year and most of the other counties had been drained in like proportion.¹³

C. W. Gooch looked upon "the semi-annual wave of emigration" as the cause, rather than the result of the "Dilapidated appearance of Virginia," and stated that land values had been depressed by the great quantities thrown on the market by the emigrants.

Instead of improving those [lands] we held before, [said Gooch] we have been tempted to add to our possessions exhausted farms and plantations ... The emigrants, besides taking with them every thing they can, draw, annually, for three years, upon the earnings of their old neighbors. Thus the land-holders have not been able to accumulate a disposable cash fund, to be applied to the improvements and the purchase of better implements, &c. On the contrary, they are too often forced to cultivate their lands with greater severity to meet these payments.¹⁴

12. William B. Smith, "An Essay Pronounced Before the Cumberland Agricultural Society, Nov. 30, 1838," Farmers' Reg., v. 6 (Dec. 31, 1838), pp. 747-749.

13. Anon., "Emigration from Virginia," Farmer and Gardener, v. 2 (Feb. 23, 1836), p. 343.

14. C. W. Gooch, "On Agriculture in Virginia," Farmers' Reg., v. 1 (July 1, 1833), pp. 121-127. It should be noted in passing

Regardless of whether poor farming practices and soil depletion were the causes or the results of emigration, the end product was obvious: Emigration in the 1830's was accompanied by widespread abandonment of land and the consolidation of small holdings into large. Because of depressed land values and smaller labor force, progress toward more intensive methods of cultivation was retarded. In all probability the area of crop land thrown out of cultivation and allowed to erode until covered by broom sedge and second-growth pine was greater in this decade than in the periods immediately preceding and following.

In the last two decades of the antebellum period jeremiads on depopulation and soil depletion became less numerous. The migration continued, but it had slackened considerably, and an agricultural orator was able to speak of the evils of emigration in the past tense.¹⁵ By this time the establishment of the local markets and improvements in transportation had had a beneficial effect. Greater farm prosperity made it possible and profitable for the larger farmers, at least, to adopt conservation methods. More intensive methods of tobacco cultivation were practiced, crop rotations were adopted, and guano and other commercial

that the flow of wealth from the old plantation areas to the new was in part reciprocated. Owners of large Piedmont plantations, and even men of smaller means, often bought cotton land in the southwest which was worked by younger sons and part of the family stock of slaves. The profits from the southwest helped to maintain the worn family estates in the Piedmont. (See for example, Cameron Papers, 1848-1851.)

15. Wm. Preston Ballard, "Address Before the State Agricultural Society," Sou. Planter, 1st ser., v. 14 (Dec. 1854), pp. 353-362.

fertilizers were in use. Nevertheless the inflated price of slaves in the 1850's, caused by the demand in the southwest, was a strain on the economy of Virginia and North Carolina, where the return from the field hand's labor was less in proportion to his value than in the southwest. In 1860 the editor of the Southern Planter was warning that in order to compete for laborers with the southwest, local farmers must increase their yield per acre.¹⁶

The Agricultural Reform Movement, 1800-1860

The movement for improving agricultural practices, which had begun in some other parts of the country shortly after the Revolution, had little influence in the Southern Piedmont until after the 1820's. Active devotees of Jefferson and John Taylor were to be found here and there in the region before that period. Some of the more alert of the large planters subscribed to the American Farmer, founded in Baltimore in 1821, and were influenced by the stirrings of reform manifest in northern Virginia and Maryland. Outstanding among these men were William Meriwether of Amelia County, Virginia, and G. W. Jeffreys of Person County, North Carolina. Edmund Ruffin's monumental work in agricultural experimentation at his home in the Tidewater, and his magazine, Farmer's Register, attracted wide attention in the 1830's and

¹⁶.Anon., "Poor Land--What Shall We Do With It?" Sou. Planter, 1st ser., v. 20 (Sept. 1860), pp. 568-569.

1840's, especially since he travelled extensively in Southside Virginia and the border region of North Carolina, making reconnaissance agricultural surveys and preaching the gospel of lime.

With the greater prosperity of the years after 1830, and better means of communication and transportation, the reform movement grew apace. The wave of out-migration in the 1830's also stimulated a desire to place agriculture on a more prosperous basis in an effort to keep the migrants at home. Farmers' clubs or societies, the first of which were founded about 1822 in this area, now became more numerous. These were local organizations, usually composed of the more well-to-do and better educated planters, with a goodly sprinkling of professional men for whom farming was a second means of livelihood. They met periodically to exchange information on farming techniques and listen to the reading of essays on progressive methods and reports on experiments with fertilizers, equipment, or crop management. Some of the clubs also conducted critical examinations of the farms and held periodic fairs.¹⁷

State agricultural societies were formed and were incorporated by the legislatures. A Society of Virginia for Promoting Agriculture was active in the second decade of the century, but

17. See for instance P. C. Venable and Wm. Haskins, "Richard Russell's Farm (Report of Upper Hole and Corner Club of Mecklenburg)," Sou. Planter, 1st ser., v. 3 (May 1843), pp. 100-101; William Irby, "Experiments," Sou. Planter, 1st ser., v. 13 (Feb. 1853), pp. 38-40; S. G. Ward, "Premium Essay on Corn ... Submitted at the Union Agricultural Fair in Henderson, N. C.," Arator, v. 1 (Dec. 1855), pp. 266-267.

[illegible]

languished. Other attempts to form a Virginia state society were made from time to time until, largely through the efforts of Edmund Ruffin, one was firmly established in 1852.¹⁸ The North Carolina State Agricultural Society was formed in 1852.¹⁹ The functions of the state societies were at first similar to those of the local societies, but in more recent times they have been primarily concerned with the holding of the annual state fair. The agricultural press of these states became the principal publicity organ for the state and local societies and the great champion of reform. The Southern Planter of Richmond, established in 1841, was the principal farm magazine of the area for some time after the discontinuance of the Farmers' Register. In the decade of the 1850's two North Carolina periodicals also entered the lists, the Arator and the North Carolina Planter, both published in Raleigh.

Of interest to the reformers also was the early work of the state geological surveys. Denison Olmsted, a professor of chemistry, geology, and mineralogy of the University of North Carolina, was authorized by the legislature in 1823 to make a geological survey. His work, carried on for four years, resulted in reports on the occurrence and use of marls in the eastern part of

18. Memoirs of the "Society of Virginia for Promoting Agriculture" (Richmond, 1818); Alfred Charles True, A History of Agricultural Education in the United States, 1785-1925, U.S.D.A. Misc. Publ. No. 36 (Washington, 1929), p. 15.

19. Transactions of the North-Carolina State Agricultural Society, for 1857 (Raleigh, 1858), p. 111.

[illegible]

It is interesting to the geologist also that the early work of the
state geological surveys. Harrison Clinton, a professor of chem-
istry, geology and mineralogy at the University of Iowa, was
was utilized by the legislature in 1887 to name a geological
survey. His work, carried on for four years, resulted in re-
ports on the occurrence and use of minerals in the eastern part of

North Carolina. Ebenezer Emmons became state geologist in 1851 and compiled two reports, one on the agriculture of the eastern counties and another on agriculture in the whole state. An 1835 act of the Virginia legislature provided for a reconnaissance and analyses of the composition of soils, minerals, and mineral waters, and a year later a geological survey was established with William B. Rogers of William and Mary College in charge.²⁰

By the time of the Civil War some pioneer work in agricultural education, experimentation, and general improvement had been done. The region had been made conscious of the need for discarding the colonial methods of agriculture and had adopted improvements on a rather wide scale. Nevertheless, the movement had not succeeded in reaching the great body of small farmers. This class of agriculturists had not the leisure time nor the financial resources to adopt improvements or make experiments extensively. A general system of agricultural education and farm demonstration for even the wealthy planter class was lacking. These conditions, pointed out by Edmund Ruffin in 1836, were changed but little in the succeeding quarter-century.²¹ Avery Craven's conclusion that "... by 1860 soil exhaustion had ceased to be a problem in Virginia" seems hardly justified in the

20. Alfred Charles True, A History of Agricultural Experimentation and Research in the United States, 1607-1925, U.S.D.A. Misc. Publ. No. 251 (Washington, 1937), pp. 12-15. See also citation to works of Emmons elsewhere in this chapter.

21. Edmund Ruffin, "Sketch of the Progress of Agriculture in Virginia and the Causes of Its Decline and Present Depression," Farmers' Reg., v. 3 (April 1, 1836), pp. 748-754.

case of the Southern Piedmont. The reform movement appears to have made more headway in the Virginia portion of the Southern Piedmont than in the North Carolina portion, but in the last decade before the war it was making greater progress in North Carolina also.²²

Management of the Tobacco Crop,
1800-1860

From the beginning of tobacco cultivation in colonial times until well into the nineteenth century the tobacco made on newly cleared land was preferred to that from soil longer under cultivation. On the intended tobacco field the trees and bushes were felled, the stumps grubbed up, and the land made as clean as possible. It was then plowed, and perhaps cross-plowed and pulverized. Hills were thrown up at intervals of three to three and one-half feet, along rows spaced about four feet apart. In the meantime the seed had been sown in a carefully selected and prepared plant bed, a spot of virgin soil in the woods. At the proper time the young plants were transferred from the bed to the hills in the field. The tobacco field was given repeated hoeings and plowings from the time the plants became well rooted until they were so large that they might be broken or otherwise injured by such cultivation. This was done to kill weeds and

22. For further discussion of the agricultural reform movement, see Craven, op. cit., pp. 147 ff.; Gray, op. cit., v. 2, pp. 915-917.

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Management of the Tobacco Crop

From the beginning of tobacco cultivation in colonial times until well into the nineteenth century the tobacco made on newly cleared land was preferred to that from well farmed under cultivation. On the intended tobacco field the trees and bushes were killed, the stumps grubbed up, and the land made as clean as possible. It was then plowed, and perhaps cross-plowed and harrowed. Hills were thrown up at intervals of three to three and one-half feet, along rows spaced about four feet apart. In the center of each hill was a small hole for a drainage outlet. The tobacco plants were transplanted from the seed bed to the hills in the field. The tobacco field was given repeated harrows and plowings from the time the plants became well rooted until they were as large as the hills in the field. This was done to kill weeds and

conserve moisture. The maximum of good tobacco planters was "never to let the grass get in it."²³ After about the fourth crop of tobacco had been taken off of a given field it was considered no longer useful for that crop and was planted to corn or wheat.

The clean cultivation for several seasons in succession, without any attempt to return plant nutrients to the soil, resulted in fairly rapid depletion of the original fertility and the beginning of serious erosion. The rather high mounds formed for each individual tobacco plant and the straight rows laid off regardless of the topography of the field also contributed to the damage resulting from running water. The type of cultivation given the crops of corn and wheat that followed after the field was deemed too "tired" of tobacco augmented the process of soil depletion.

The progressive scarcity of virgin tobacco land was felt in respect to individual plantations and to the area as a whole, and eventually forced changes in the method of crop management. Quite often the first parts of the plantation to be cleared were near the house and barns, but as fresh soil became scarce near the buildings the tobacco planter was obliged to make fields farther and farther from them, thus increasing the labor and expense of hauling, and gradually reducing the fertility of his entire tract.²⁴ The planter with sufficient capital might

23. Peyton Harrison to William B. Harrison, Clifton, Va., Dec. 30, 1853, Cabell MSS.

24. Edwin G. Booth, "Essay on the Renovation of Worn-Out Lands," Sou. Cul., v. 12 (June 1854), pp. 170-173.

increase his reserves of fresh soil by buying out his neighbors, but in the meantime much of their land also had been depleted. There was accordingly a limit to the profitable enlargement of virgin soil holdings in any one locality. Sooner or later the planter must choose among several alternatives. He could buy new holdings in other regions and move to them or send part of his family and labor force to work them; he could abandon tobacco cultivation in favor of some other crop; or he could produce tobacco on manured old land.

The time at which the shortage of fresh land for tobacco became critical seems to have varied from north to south and southwest within the Tobacco and Mixed Farming Area and from farm to farm within any one neighborhood. By 1837 it was said that the best lands in Campbell County, Virginia had long been cultivated to exhaustion and that farmers were then clearing lands of poorer quality and quickly reducing these to sterility.²⁵ Some five years later about the same observation was made regarding Amelia County, one writer remarking that "our lands in this part of Virginia are well nigh all cleared up, and farmers are beginning to use the axe with a more cautious and sparing hand! ... For tobacco, it is quite certain, we must have manured lots."²⁶

25. Anon., "Valuable Influence of Agricultural Journals. Agriculture of Campbell County," by a Young Farmer, Farmers' Reg., v. 5 (May 1, 1837), pp. 34-35.

26. Anon., "Tobacco," by A. Z., Sou. Planter, v. 2 (Oct. 1842), p. 232.

In Lunenburg County about the same time concern was expressed about the growing scarcity of virgin soil even for tobacco plant beds.²⁷ In Halifax County, Virginia in the 1850's tobacco was said to be cultivated on fresh land in the same manner as was practiced during the Revolution,²⁸ but this seems to have been an exaggeration. Counties in the southwest such as Pittsylvania and Henry, and most of the North Carolina tobacco counties, on the other hand, do not appear to have been intensively utilized until after about 1850.

In colonial times the period of tobacco raising on any one field was sometimes prolonged by the erection of cattle pens upon it so that it would receive the droppings of the animals, but there was a prejudice against this practice, one seventeenth century observer stating that "it produces a strong sort of Tobacco, in which the Smokers say they can plainly taste the fulsomness of the Dung."²⁹ This belief that manured land produced

27. N. A. Venable, "Tobacco," Sou. Planter, v. 3 (March 1843), pp. 63-65.

28. James C. Bruce, Miscellaneous Communications, Report of the Commissioner of Patents for the Year 1850. Part 2, Agriculture, H. of R., 31st Cong., 2nd sess., Exec. Doc. No. 32 (Washington, 1851), p. 342.

29. John Clayton, "A Letter from Mr. John Clayton Rector of Crofton at Wakefield in Yorkshire, to the Royal Society, May 12, 1688," in Peter Force, Tracts and Other Papers, Relating Principally to the Origin, Settlement, and Progress of the Colonies in North America, from the Discovery of the Country to the Year 1776 (Washington, 1836-1846), v. 3, no. 12, pp. 20-21. The observation of Hugh Jones that, "land when hired is forced to bear Tobacco by penning their Cattle upon it," has been interpreted to mean that worn out plantations were rented to tenants, but in view of the context it is possible that "hired" may be a misprint for "tired". (Jones, Present State of Virginia, p. 39; Gray, Hist. of Agri. in Southern U. S., v. 1, p. 217.)

inferior tobacco persisted in some areas of the Piedmont as late as the third decade of the nineteenth century, but cowpenning continued to be practiced by some tobacco growers.³⁰ This haphazard method of fertilizing was later replaced by the making of intensively manured tobacco lots.

When the system of manured tobacco lots was adopted the total acreage in tobacco was probably diminished in order to give greater care to the smaller area. Dung from the barnyard, leaves from the forest, and other farm refuse was collected and hauled out to the field intended for tobacco. After the land was pulverized thoroughly the manure was plowed in. Many planters now kept the same field in tobacco year after year. This was especially true on plantations that were rolling or hilly, where manure would be swept off of sloping fields with the first rain. Thus, on a plantation of about 500 acres, a level area of some six or seven acres, sufficient for 25,000 tobacco hills, conveniently located near the house, would be kept in tobacco and receive all the manure or compost collected, leaving the other unfertilized crops to the more rolling lands.³¹ Other tobacco planters decried the keeping of permanent tobacco lots, saying that other fields and crops were neglected. They shifted their manured tobacco lots from place to place over the plantation.

30. William Tatham, An Historical and Practical Essay on the Culture and Commerce of Tobacco (London, 1808), pp. 5-7.

31. James C. Bruce, "Horizontal Trenching to Prevent the Washing of Hilly Lands," Farmers' Reg., v. 1 (Nov. 1833), pp. 334-335.

It was claimed that this method gradually enlarged the area of enriched land and allowed the crops following tobacco to receive the benefit of the manure second hand.³²

Other improved methods were adopted. Some farmers practiced a rotation of tobacco, wheat, and clover.³³ In many instances the clover or some grass such as herds grass was plowed under to improve the land for the succeeding crop of tobacco.³⁴ There was a tendency to cut down the tobacco acreage and bestow greater attention than before upon the tillage and later handling of the crop. Although the old method of planting in hills still prevailed, some planters preferred to set their upland tobacco in contoured rows or beds to hold moisture and thus prevent injury from drought and to prevent soil loss.³⁵ The smaller acreage and improved cultivation of tobacco increased yields per acre and made the quality of the leaf better on the more progressive farms. Greater attention could be bestowed on other crops

32. Anon., "Valuable Influence of Agricultural Journals. Agriculture of Campbell County," by a Young Farmer, Farmers' Reg., v. 5 (May 1, 1837), pp. 34-35; Anon., "Tobacco--the Life and Soul of Virginia Husbandry," by Nicot, N. C. Planter, v. 2 (April 1859), pp. 109-110.

33. Anderson C. Morton, "On the Improvement of Tobacco Lands by Clover," Farmers' Reg., v. 4 (Nov. 1836), pp. 385-386.

34. B. W. Leigh, P. C. Venable, "Upper Hole and Corner Club of Mecklenburg," Sou. Planter, 1st ser., v. 4 (May 1844), p. 107.

35. J. F. Edmonds, "Directions for the Cultivation and Management of Tobacco," in Comm. of Patents, Report, 1854, Agriculture (Washington, 1855), p. 210.

It was claimed that this method of growing tobacco was not as
 successful as the old method of growing tobacco in the
 hills of the western part of the State.
 When improved methods were adopted, some farmers practiced
 a rotation of tobacco, wheat, and clover, or corn and
 tobacco. It was claimed that the tobacco grown in the hills
 was a failure to cut down the tobacco stalks and burn them
 off. Although the old method of planting in hills still pro-
 duced good crops, some farmers practiced the new method of
 planting in rows. It was claimed that the tobacco grown in
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W. B. Smith, "The Influence of Agricultural Machinery,"
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 in *The Influence of Agricultural Machinery*, pp. 1-10.
 W. B. Smith, "The Influence of Agricultural Machinery,"
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 in *The Influence of Agricultural Machinery*, pp. 1-10.
 W. B. Smith, "The Influence of Agricultural Machinery,"
 in *The Influence of Agricultural Machinery*, pp. 1-10.

also.³⁶

In the 1840's guano imported from Latin America was introduced into this part of the country and was used near railroads and river communication where farmers could afford it. Some farmers believed, however, that guano was more suitable for other crops than for tobacco, and that the quality of tobacco produced with the aid of guano was not as good as that produced with barnyard manure.³⁷ In the Bright Tobacco sections, just before the Civil War, it was nevertheless recognized that Peruvian guano applied on both old and new gray ridge land would greatly benefit the crop.³⁸

The yield of tobacco per acre varied widely, depending upon the freshness of the land, the amount of manure used, the type of tobacco, and other factors. Over the Tobacco and Mixed Farming Region as a whole the yield varied from about 300 to 1300 pounds to the acre around 1850, and the average yield was probably about 660 pounds. The average yield probably did not change greatly before the advent of bright tobacco, although progressive farmers might increase their yields considerably by intensive

36. N. Francis Cabell, "Report on Virginians Who Have Introduced Improvements in Agriculture," in Journal of Transactions of the Virginia State Agricultural Society from its Organization to the Close of the First Annual Exhibition of 1853, v. 1 (Richmond, 1853), pp. 112-119; Anon., "Small Farms," by K.R.S., Sou. Planter, 1st ser., v. 4 (June 1844), pp. 122-123.

37. Richard F. Taylor, "Tobacco. Its Culture and Management," Sou. Planter, 1st ser., v. 16 (Oct. 1856), pp. 293-296.

38. Samuel C. Shelton, "Culture and Management of Tobacco," Sou. Planter, n. s., v. 1 (Feb. 1867), pp. 1-12.

methods.³⁹ Although tobacco was the principal cash crop, it occupied only a small percentage of the improved land. It has been estimated that in seven Southside Virginia counties the median tobacco farm had only 5 1/2 acres in the crop in 1859.⁴⁰ By a similar calculation, the median farm in Caswell County, North Carolina in the same year contained about 195 acres of improved land, of which only about 9 acres were in tobacco.⁴¹

Shifts in Farming Sites and the Problem of Tobacco Soils

The principal sites of cultivation in the Piedmont remained in the bottom lands and on the nearby slopes for a long time after the Revolution. The comparatively narrow bottom lands of the major streams were the first choice. Outstanding in this class of lands were the James River bottoms. In the 1830's and 1840's these lands, bearing good crops of wheat and tobacco, were valued at \$50 to \$100 per acre.⁴² Lands along the Roanoke, Dan Rouse, Haw, and other large rivers, although at first farther

39. Robert, op. cit., p. 249.

40. Ibid., p. 245.

41. Based on Eighth Census, Agriculture, Caswell County, N. C. (1860), MSS, North Carolina State Library, Raleigh. The average yield of 660 lb. per a. is used in making the computation of tobacco area. (See also Appendix No. V, Table No. 1.)

42. Anon., "Virginia Lands," by H.D.X., American Agriculturist, v. 3 (April 1844), p. 104; Edmund Ruffin, "Notes on a Three-Days Excursion into Goochland, Chesterfield and Powhatan," Farmers' Reg., v. 5 (Oct. 1, 1837), pp. 262-373.

from markets and improved transportation, were also highly valued, the Roanoke lands of Mecklenburg County, Virginia being worth as much as \$50 per acre in the 1840's, compared with a value of up to \$20 for nearby highlands.⁴³ The areas of second choice were in the watersheds of medium sized streams tributary to the major rivers. The bottoms of these streams, although rich and utilized rather frequently, were very narrow and subject to overflow, and furnished only a small part of the cultivated area. The largest portion of cultivated land in this class was accordingly on the slopes near these streams. It seems probable, indeed, that the greatest area for cultivation of the entire Piedmont surface was furnished by this type of undulating land before the Civil War. In 1836 such lands in the watershed of Wards Fork, Charlotte County, Virginia were worth about \$20 per acre.⁴⁴ Tobacco, as well as the other principal crops of the farm, were raised on this class of land.

The lands of third choice and least value lay along the inter-stream divides, and were described as poor gray uplands or as broken, stony, or gravelly ridge lands. The last to be cleared and placed in cultivation, these lands were in some cases reserved mainly for pasturage.⁴⁵ They derived a certain value from

43.[Botts, C. T.], "Mecklenburg Co.," Sou. Planter, v. 4 (Aug. 1844), pp. 188-189.

44.[Edmund Ruffin], "Rough Notes upon Some of the Agricultural Improvements of Charlotte, Va. and Adjacent Counties," by a Gleaner, Farmers' Reg., v. 4 (Oct. 1836), pp. 374-377.

45.Ibid.; Alexander Sneed, "Rockingham County," one of series, "Twelve North Carolina Counties in 1810-1811," edited by A. R. Newsome, N. C. Hist. Rev., v. 6 (July 1929), pp. 294-300.

the fact that the principal roads ran along the divides in many places and that the ridges were well-drained house and barn sites. The small county seat towns that were beginning to develop before the Civil War were generally located on such uplands. Erosion or depletion of more valuable lands or increasing population eventually led to the cultivation of the ridge lands, but on the whole they were not considered of great agricultural value until near the close of the antebellum period.⁴⁶

The most desirable lands were also the ones most exposed to injury from running water. In the bottom lands the crops were not infrequently injured or entirely swept away by freshets, and the good soil was buried underneath debris from the river itself or from adjacent highlands.⁴⁷ In spite of this the farmers of bottom land, whether on the major streams or the smaller creeks, were willing to take the risk of flooding for the sake of the richness of the soil.⁴⁸ Furthermore, the deposition of material

⁴⁶The series of Virginia county maps compiled by the Confederate Engineering Bureau, Richmond, Virginia, General J. F. Gilmer, Chief Engineer, about 1864, illustrate rather clearly the relationship of cleared and uncleared land, roads, and houses to relief at that time. Originals in Virginia Historical Society, Richmond. See especially Amelia, Charlotte and Brunswick.

⁴⁷Anon., "The Freshet," Richmond [Va.] Enquirer, v. 11 (Aug. 3, 1814), p. 3, col. 5 (James River freshet); Anon., "Prospects of Crops," Amer. Farmer, v. 8 (July 21, 1826), p. 139 (Dan River in N. C.); Report of the Commissioner of Patents for the Year 1844, H. of R. 28th Cong., 1st sess., Ex. Doc. 177 (Washington, 1844), p. 73 (tobacco on small streams destroyed, Va.).

⁴⁸Some Fragments of an Intended Report on the Post Revolutionary History of Agriculture in Virginia, Cabell MSS. Cabell believed that freshets on the main rivers were more frequent in the eighteenth century than later, but that freshets on the tributaries

on the bottoms was not always a detriment. It was claimed that the overwashing of the tenacious white clay soils of smaller creek bottoms by material from adjacent hillsides in some cases improved the quality of these lands.⁴⁹

The erosiveness of the sloping uplands, the second class of land discussed above, was of greater consequence to agriculture than the flooding and silting of the bottom lands to the extent that the area of upland utilized by agriculture was greater. The rolling uplands were considered as among the most valuable, yet it was precisely on these lands, because of their declivities, that gullying and sheet wash started first and operated most rapidly. About 1810 it was reported that while the best lands in Caswell County, North Carolina, were in the watershed of Country Line Creek, they were so hilly that the soil washed away in the course of ten or twelve years' cultivation.⁵⁰ About the same observation was made by Edmund Ruffin regarding Charlotte County, Virginia, Warren County, North Carolina, and other

continued to constitute a major problem. The former opinion seems of doubtful validity; H.D.X., "Virginia Lands," loc. cit.

⁴⁹Newman, J., "Draining," Sou. Planter, 1st ser., v. 12 (Feb. 10, 1852), pp. 117-119.

⁵⁰Yancey, Bartlett, "Caswell County," of series "Twelve North Carolina Counties in 1810-1811," N. C. Hist. Rev., v. 5 (Oct. 1928), pp. 421-424. The lands thus designated as susceptible to erosion are approximately the same as those classified in 1938 as too rough and eroded to be used for profitable agriculture. See N. C. State Office, Land Economics Division, Bureau of Agricultural Economics, Preliminary Report of Land Use Conditions in Caswell County, North Carolina (n. p., Dec. 8, 1938).

areas in the Piedmont in the 1830's.⁵¹ In Amelia County, Virginia a progressive farmer who had bought a worn and gullied place in the late eighteenth century and had restored it to life declared in 1818 that the uplands throughout the south were so eroded that they should be allowed to rest from both tillage and grazing, and that the cultivation of corn and wheat should be restricted to the bottom lands. He would have abandoned the cultivation of tobacco completely.⁵²

The expansion of tobacco culture south and west into the Piedmont in the colonial and early national periods brought about an evolution in tobacco types, for there are few agricultural products more sensitive to changes in soil than the tobacco plant. Of the two types of tobacco developed in the colonial period, the Sweet-Scented and the Orinoco, the latter was produced on the virgin lands of the frontier. Like all colonial tobaccos, it was raised primarily for export. It had a large pointed, bright colored leaf and a stronger taste than the Sweet-Scented.⁵³ Further expansion inland and southward was accompanied by the development of many other types from the Orinoco parent stock.

The early cultivators of fresh land in the Piedmont were

51.[Edmund Ruffin], "Remarks Suggested by a Visit to Warren County," Farmers' Reg., v. 4 (Aug. 1, 1837), pp. 228-231.

52.William Merivether, "Agricultural Essays, No. 5," Amer. Farmer, 1st ser., v. 2 (April 20, 1820), pp. 35-37.

53.Hugh Jones, Present State of Virginia, pp. 34-39.

found in the literature in the 1930's.²¹ In America County, Vir-

ginia a representative farmer told me that a very old family

place in the late eighteenth century and had returned it to life

developed in life that the upland throughout the south were so

needed that they should be allowed to grow in the hills and

hills, and that the cultivation of such land should be

restricted to the hillside. The hillside was considered the

best place for tobacco completely.²²

The expansion of tobacco culture south and west into the

interior in the United States was a gradual process.

about as well known in tobacco areas, the early use of tobacco

leaf products more sensitive to changes in soil than the tobacco

plant. Of the two types of tobacco developed in the colonial

period, the dark-leafed and the light-leafed, the latter was

based on the early type of the tobacco. The all-leafed

dark-leafed, it was raised primarily for export. It was a large

plant, bright colored leaf and a stronger taste than the sweet-

leafed.²³ Further expansion inland and southward was accom-

panied by the development of new types from the British

parent stock.

The early cultivation of tobacco in the United States

²¹ J. H. Brown, "Tobacco in America," *Journal of American History*, Vol. 26, No. 1, (1932), pp. 1-10.

²² J. H. Brown, "Tobacco in America," *Journal of American History*, Vol. 26, No. 1, (1932), pp. 1-10.

²³ J. H. Brown, "Tobacco in America," *Journal of American History*, Vol. 26, No. 1, (1932), pp. 1-10.

probably not greatly concerned with differences in soil type. The newly cleared tobacco patch might be on upland or lowland, provided it was well-drained and free from rocks. Nevertheless, some planters recognized by the early decades of the nineteenth century that tobacco made on low grounds was coarser in fiber and less marketable than that grown on uplands.⁵⁴

Of the upland soils, those of the middle slopes, such as Cecil clay loam and a considerable extent of the Cecil sandy loam, were probably the principal ones used for tobacco production until about the 1840's or later. This was especially true in the southwestern counties of the Virginia Piedmont and in North Carolina, since a larger percentage of the land remained uncultivated in these areas than in the northern and eastern parts of the Virginia Piedmont.⁵⁵

It seems that in much of the Virginia Piedmont large crops of high quality tobacco were no longer raised on fresh land by the fourth decade of the nineteenth century. The Pryor tobacco was a favorite of planters south of the James River. It was a high quality leaf raised for export. Rich low grounds or highly manured uplands were the best types of soil for it, but it would not ripen properly upon virgin soil.⁵⁶ Orinoco also had ceased to be

⁵⁴. Some Fragments of an Intended Report on the Post Revolutionary History of Agriculture in Virginia, Cabell MSS; Peter Minor, "On the Cultivation of Tobacco," Arator, v. 1 (Feb. 1856), pp. 353-357.

⁵⁵. See for instance Alexander Sneed, loc. cit.

⁵⁶. J. B. Killebrew, Report on the Culture and Curing of Tobacco in the United States, in Tenth Census, Agriculture, v. 3, p. 810.

usually was found associated with differences in soil type.

The early stages of growth were almost identical in all cases.

However, it was well-trained and free from weeds. Nevertheless,

the plants were well-trained and free from weeds.

On the other hand, tobacco made on low grounds was common in this

and was considerably less than that grown on uplands.

At the present time, some of the main crops are:

Corn, soy beans and a number of other crops of the field and garden.

Very probably the principal ones used for tobacco production are:

The above are the crops of the field and garden. This was especially true in the

early stages of the tobacco industry. The tobacco industry was in the

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regarded as exclusively a rich soil tobacco. It was now grown not only upon fresh land but upon poor gray uplands that had been cultivated. The stage was now set for the great revolution in the production of tobacco. It was found that the light gray lands, comparatively low in organic matter, such as Durham sandy loams and Appling sandy loams, especially in the Virginia-North Carolina border counties, produced a leaf that was lighter in color, sweeter in taste, and of finer texture than that grown on the heavier soils of central Virginia. Eventually this type of leaf became popular for domestic manufacturing purposes.⁵⁷

Cultivating the Orinoco types on these light colored soils, Piedmont farmers developed the Bright Tobacco that now forms the basis of the Southern Piedmont tobacco industry. The Slade brothers and their slave Steven of Caswell County, North Carolina, are traditionally credited with raising the first crops of Bright Tobacco on a thin sandy ridge in 1852 or 1853, but it seems that their efforts were part of a general development that had begun somewhat earlier. At first it was thought that the Slade's method of curing was responsible for the bright yellow color, but later it was found that the soil was of more influence. The early crops of the new type brought high prices and increased interest in lands that had hitherto been considered of little value. Ebenezer Emmons, Geological Surveyor of North Carolina, pointed out in 1853 that the light gray soils of the northern border, in Granville,

⁵⁷Wightman W. Garner, The Production of Tobacco (Philadelphia, 1946), pp. 24, 26, 38-39.

regarded as exclusively a rich soil tobacco. It was not given
 that early years toward 1860 but some years later tobacco was
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 the production of tobacco. It was found that the light soil
 lands, commercially in a certain extent, such as tobacco, hemp
 beans and timothy early lands, especially in the Virginia-hemp
 Carolina hemp counties, produced a leaf that was lighter in
 color, sweeter in taste, and of less density than that grown on
 the heavier soils of central Virginia. Especially this type of
 leaf became popular for cigarette manufacturing purposes.¹⁷
 Cultivating the tobacco crop on these light colored soils,
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 that the light type soils of the northern counties, in Carolina,

17. William W. Garner, The Production of Tobacco in Virginia,
 1940, pp. 74, 80, 82-83.

Person, Caswell, and Rockingham Counties were adapted to the growth of fine tobacco.⁵⁸ Bright Tobacco appears to have been raised mostly in Caswell and the neighboring county of Pittsylvania, Virginia before the Civil War, and development was beginning elsewhere. In 1861 a farmer in Henry County, Virginia said that fresh land was best for tobacco but that old gravelly gray ridge land if manured properly would make a good product.⁵⁹

Authorities on tobacco have pointed out that the shift southward of tobacco production to the light sandy loam soils of the Virginia-North Carolina border was responsible for the emergence of the Bright Tobacco type.⁶⁰ In reality, this shift seems to have been two-fold in nature. There was the expansion toward the south and west, but there was also progression "uphill" from the bottom lands and lower and middle slopes to the interfluvial divides.

The movement on to the interstream divides in its early phases was in part a response to the erosion and depletion that had taken place on the richer and originally more valuable lands

58. Ebenezer Emmons, Report of the North Carolina Geological Survey. Agriculture of the Eastern Counties (Raleigh, 1858), p. 10. For a discussion of the origin of bright leaf tobacco see Nannie M. Tilley, "The Bright-Tobacco Industry, 1860-1929," Ph.D. thesis, Duke University, 1939.

59. Samuel Sheldon, "The Culture and Management of Tobacco," Sou. Planter, v. 21 (April 1861), pp. 209-218.

60. Garner, op. cit.; Garner, E. G. Moss, and others, "History and Status of Tobacco Culture," Agriculture Yearbook, 1922, p. 408.

down-slope. It is not without significance that in Caswell county, in which bright tobacco is supposed to have been discovered, erosion had become a cause for complaint quite early in the century, and that by 1850, in the beginning of the bright tobacco period, over one-half of the farmland had been cleared and put to use. The movement up-slope was at first a negative one, away from gullied and "worn out" heavier soils. Later it became a positive search for gray ridge lands when farmers discovered that these held the treasure of the bright golden leaf.

Management of General Crops,
1800-1860

Many planters regarded corn as a greater "land killer" than tobacco because it subjected the fields to a larger area of clean tillage and because it was given less attention than tobacco. The old colonial methods of corn culture persisted throughout much of the Southern Piedmont well into the nineteenth century. The land was "cross plowed" to a very shallow depth with a light one-horse plow and the corn was planted in the "checks". Even as progressive a farmer as William Merivether complained in 1818 that with a two-horse plow he could not plow deeper than 6 or 7 inches. The initial plowing was followed, after the corn was up, by rather deep cultivation with the plow. This caused the roots to be cut. A consequence of the shallow initial plowing, followed by hasty cultivation was that little moisture was preserved

to protect the crop from summer drought. Because of the poor tillage, growing crops could not take full advantage of the rainfall, and this probably accounts as much for the numerous complaints of drought ruining the corn crop as does any actual deficiency of rainfall.⁶¹

Between 1800 and 1860 many improvements had been made in corn cultivation. By the 1850's in the James River counties, Granville county, North Carolina, and perhaps elsewhere, corn land was plowed deep in the fall or early winter, with two, three, or four horse plows, and harrowed before planting in the following spring. Corn was planted in drills spaced from 4 to 5 feet apart. In the after-cultivation, care was taken to leave the land level, that is, without deep furrows or ridges.⁶² On upland this method lessened the accumulation of water and diminished the erosion hazard somewhat. Corn rows were run on the contour and hillside ditches were made in further efforts to prevent soil washing. (See Chapter VII.) On bottom lands or other low areas where there was excessive moisture the corn fields were plowed into raised beds several rows wide, with drainage furrows between the beds.⁶³ These methods of corn culture were adopted by prosperous,

61. See for instance Jas. W. Jeffreys, "Large Corn," Amer. Farmer, v. 10 (Dec. 12, 1828), p. 308; [Editor], "The Drought," Farmer & Gardener, 1st ser., v. 5 (Aug. 14, 1838), p. 122; Randolph Harrison, "Corn Culture," Sou. Planter, v. 44 (July 1883), pp. 350-351.

62. Thos. M. Bondurant, in Comm. of Patents, Report, 1851, Part 2, Agriculture (Washington, 1852), p. 303; S. G. Ward, "Premium Essay on Corn," Arator, v. 1 (Dec. 1855), pp. 266, 267.

63. Richard G. Morriss, "Corn--Close Planting, Early Working," Sou. Planter, 1st ser., v. 5 (Feb. 1845), p. 36-37; Anon.,

advanced farmers and in localities near good markets. The fact that the older methods continued to be practiced in more backward areas is attested by the repeated advice in the agricultural press to abandon them.⁶⁴

Manure and other fertilizing ingredients were not used for corn to any great extent until rather late in the antebellum period. The farmers who plowed stable manure into the corn land or collected leaves for that purpose were rather exceptional, even in areas where the tobacco did not consume all the compost made. Progressive farmers who paid careful attention to grasslands and cattle had some manure left over from the tobacco lots and had begun to apply it to the corn near the end of the period. Gypsum was used occasionally as a top dressing and as a supplement to the compost heap. Guano was applied either alone or mixed with compost and gypsum, but there was considerable difference of opinion as to its efficacy on the corn crop. When applied alone it was sometimes scattered broadcast at the rate of 200 pounds per acre.⁶⁵

"Cultivation of Corn," by T.T.T., Sou. Planter, 1st ser., v. 12 (May 1852), p. 139.

64. Anon., ["Methods of Cultivating Corn"], N. C. Planter, v. 2 (Jan. 1859), pp. 25-26.

65. Leigh and Venable, loc. cit.; W. J. Bingham, "Guinea Grass," Sou. Planter, 1st ser., v. 6 (Jan. 1846), pp. 4-5; Richard I. Gaines, "Farmers and Farming in Virginia in the Olden Time, No. 16," Sou. Planter, 3rd ser., v. 44 (Nov. 1883), pp. 523-524; Ward, loc. cit.; Anon., "Neglect of Agriculture in Guilfield [Guilford] N. C.," Farmers' Reg., v. 7 (Aug. 31, 1839), p. 455; John Makenzie, "Guano," Sou. Planter, 1st ser., v. 5 (June 1845), p. 140.

It is stated by the respondent that in the application
that the other parties mentioned to be protected in more backward
countries (especially in India) where they are not known.

Source: U.S. Census Bureau, *Marriage, Divorce, Remarriage in the 1990s*, p. 10.

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U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON, D. C.

1. The first part of the document is a letter from the President of the United States to the Congress, dated January 3, 1862. It is a message of condolence to the people of the State of California, who have recently suffered from a severe earthquake. The President expresses his sympathy for the victims and offers his assistance in rebuilding the state.

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

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The production of corn per acre on James River bottom lands in 1850 was estimated at 40 to 50 bushels, on good uplands in the same area, at 30 bushels, and on the ridges, at 5 bushels, the average for the vicinity being 15 to 20 bushels.⁶⁶ From the available evidence this seems to be a fair statement of the range in yield and the average production of much of the Tobacco and Mixed Farming Area.

When wheat and clover and oats were used on the farm they counteracted somewhat the harmful effects of the clean tillage. The wheat furnished a winter cover for the land and the clover a close-growing summer cover. Wheat was sown in the early fall upon land that had been in tobacco or corn. The fine pulverization given tobacco land as well as the manure used for tobacco made it an excellent preparation for wheat. This compensated for the fact that tobacco crops were sometimes late and delayed wheat sowing. Careful farmers broke up the corn land before sowing and then harrowed after sowing. Wheat was also sown on "fallow" land, that is, land that had been idle or in clover the preceding summer and had been broken up about August or early September.

Such were the methods used in the counties bordering the James River and to some extent the next tier of counties to the south. In these counties the methods of managing the small grains and grasses were similar to those farther north in Virginia, where the land had been greatly improved by the use of clover and gypsum

⁶⁶.Bondurant, op. cit.

early in the nineteenth century. After its introduction, guano was widely used on land being prepared for wheat in the James River counties. The yields here in the 1850's ranged from about 20 to 30 bushels of wheat to the acre on low grounds or lots enriched with guano, down to about 8 bushels on ordinary land.⁶⁷ Farther south wheat was not as carefully cultivated and the yields in many instances were lower. In Orange County, North Carolina it was said that the corn land was left in rough tilth, without much preparation before putting in the succeeding crop of wheat, and that the wheat yield had probably declined for years past, until in 1850 it was not more than 5 bushels.⁶⁸ Western central North Carolina was nevertheless an important grain producing area, and by 1860 the counties here outranked most of the Virginia counties in wheat production.

There was a tendency for tobacco to be of greater relative importance on the larger farms than on the smaller. (See Appendix No. V, Tables No. 1 and 2.) The smaller farms were more likely to be the all-round producers of general crops and to keep more livestock in proportion to their acreage. Oats, however, was of greater relative importance on large farms.

67. R. T. Hubbard, in Comm. of Patents, Report, 1851, Part 2, Agriculture, pp. 292-293; John H. Cocke, "Gen. J. H. Cocke's Wheat," Sou. Planter, 1st ser., v. 16 (Sept. 1856), p. 268.

68. W. J. Bingham, in Comm. of Patents, Report, 1850, Part 2, Agriculture (Washington, 1851), p. 375.

Chapter IV

THE TOBACCO AND MIXED FARMING AREA, 1860-1930

Summary

The bright tobacco industry, interrupted by the Civil War, entered upon its period of greatest expansion afterward. The sterile gray uplands and pine-covered old fields of the Piedmont were now numbered among the area's most important resources. Although the tobacco acreage, and even the total acreage of improved farmland, remained smaller than before the war, bright tobacco production spread north into the old dark tobacco counties of Virginia, west to near the foot of the mountains in North Carolina, and south into the central North Carolina Piedmont. Meanwhile the original bright tobacco counties along the border became infected with Granville wilt and other diseases, and this stimulated expansion in search of fresh soils. After 1900 the Coastal Plain became important as a producing region, eventually surpassing the Piedmont.

In this tendency to expand, as well as in other respects, bright tobacco exhibited the characteristics of a pioneer commercial crop. Virgin forest or pine land was cut down for the tobacco fields or to furnish wood for curing; bright tobacco was not adapted to a system of rotation with manuring or cover crops because of the danger of producing too coarse a leaf or harboring some tobacco disease in the preceding crops; the only plant food added to the soil was applied directly to the crop in the form of commercial fertilizers or barnyard manure. Heavier rates of fertilization have increased yields in more recent times, but successful rotations worked out by experiment stations have not been generally adopted. Hillside ditching and terracing were not adopted to the extent that they were in cotton-producing areas. The relatively small amount of land required in tobacco cultivation, the fact that the crop was raised on poor soils, and that it was thought not to be adapted to a system of rotation or permanent land building discouraged efforts toward soil conservation practices.

Tobacco production and, in the east, cotton production have expanded at the expense of most other crops. Old wasteful habits of cultivating the secondary crops continued in many cases, but on the whole there was improvement, as evidenced by the increased yield per acre of practically all important crops. Notable improvements were made in animal industries, although livestock continued to play a secondary part in the agricultural system. New hay and pasture plants such as the lespedexas, crimson clover, and soy beans were introduced. These also became important as land

builders when planted among the tilled crops. The colonial fence laws, requiring cultivated fields to be fenced against livestock, were changed in the 1870's and 1880's. The new laws provided for the fencing in of stock. They made possible some improvement in breeds. The expense of fencing and the waste of timber for keeping fences up were decreased as a result of the new laws. A more efficient use of cultivated acreage was possible, although the new laws worked a hardship on the small farmer or tenant keeping scrub stock. The eradication of Texas fever through the efforts of the United States Department of Agriculture removed a major handicap to cattle raising. The growth of the tobacco and textile towns has to some extent increased the demand for animal products and other products of diversified farming, but the possibilities of major development in this field are rather limited.

Following the Civil War there was a large exodus from the area, but this was later counterbalanced by the growth of towns and industries. In the disturbed times following the war there was an attempt to attract immigrants from the north or Europe but this met with little success. Another period of exodus of the rural population was during the two decades 1920-1940. The acreage of improved farmland and of individual crops decreased in this period also.

The hard times following the Civil War and again in the 1880's and 1890's engendered the growth of farmers' organizations. The new organizations created by this movement, the Grange and the Farmers' Alliance, differed from the old reform organizations by being national as well as local in scope, by exerting a wider mass

appeal, and by emphasizing cooperative selling and buying and political action to secure the farmers' demands. They were, nevertheless, interested in improving farming techniques and educating the farmer in their use. These organizations helped to secure the establishment of state departments of agriculture to test fertilizers and perform other functions for the farmers, and aided in the foundation of the state agricultural colleges and experiment stations. Later steps taken toward the better education of the farmer were the establishment of the system of county farm demonstration agents, and the introduction of agricultural education into the public schools.

In the meantime the movement for the conservation of natural resources began to assume national significance. Federal agencies, such as the Forest Service and the Bureau of Soils of the Department of Agriculture and the Geological Survey, working in the Southern Piedmont and the mountain regions, helped to make the farmers of the tobacco area once more conscious of soil conservation as a major problem. The tobacco area, formerly not greatly interested in conservative land use, now became more "erosion conscious". This interest continued to grow as a result of the hard times of the early 1920's and the depression of the 1930's.

The Tobacco Crop

The Civil War caused a temporary interruption in the development of the bright tobacco industry, but the great increase in

apart, and by separating cooperative selling and buying and political action to secure the farmers' freedom. They were, nevertheless, interested in preventing landed monopolies and in calling the farmer in their aid. These regulations helped to secure the establishment of state departments of agriculture to cost legislation and perform other functions for the farmer, and also in the formation of the state agricultural colleges and experiment stations. Later steps taken toward the better education of the farmer were the establishment of the system of county farm demonstration agents, and the establishment of agricultural extension laws in the public schools.

In the meantime the movement for the improvement of industry likewise began to assume national significance. Several agencies, such as the Forest Service and the Bureau of Soils of the Department of Agriculture and the Geological Survey, were in the forefront of the movement and the national government, helped to make the farmers of the tobacco states more conscious of soil conservation as a major problem. The tobacco growers, however, were greatly interested in intensive farming and the tobacco was "cured naturally". This tobacco continued to grow as a result of the hard work of the early years and the depression of the 1930's.

The Tobacco Grower

The Civil War caused a temporary interruption in the development of the tobacco industry, but the great increase in

tobacco manufacturing that followed the struggle brought a demand for bright tobacco and an expansion of its cultivation on gray sandy uplands. In some areas in North Carolina these comparatively sterile lands, which in 1860 were worth \$1.00 to \$3.00 per acre, were bringing from \$20 to \$100 per acre by 1879. Old fields bearing second growth pine which would scarcely have produced one bushel of corn to the acre were sold in the late 1870's for \$50 per acre for bright leaf production. Counties now boasted of the amount of poor land within their borders. Dark tobacco continued to be produced in North Carolina on the heavier soils, but the greatest effort was spent on the bright tobacco.¹

In more recent times the cultivation of bright tobacco on the gray uplands has spread still farther. Durham sandy loams, Appling sandy loams, and Granville sandy loams are considered among the best soils for the crop, but Cecil sandy loams are highly regarded and because they are so widespread they probably constitute the most important land for tobacco. At the same time the soils formerly most cultivated, such as the reddish clay loams and other soils of the slopes, have been to a large extent abandoned and have reverted to forest. By the 1920's, in an area where 60 to 75 percent of the gray sandy loams was in cultivation, not over 45 percent of the clay loams was farmed.² Erosion had before this

1. Killebrew, Tobacco Report, 1880, pp. 110-111.

2. Soil Survey, Rockingham County, N. C. (1926), pp. 11-17; Soil Survey, Franklin County, N. C. (1931), pp. 9, 14-15.

The tobacco industry in the United States is a highly competitive one, and the industry has been suffering from a decline in demand for its products. The industry has been hit hard by the economic downturn, and the demand for tobacco products has fallen significantly. The industry has been forced to cut costs and reduce production in order to remain viable. The industry has also been hit by the rise of e-cigarettes, which have taken a significant portion of the market. The industry is currently in a state of flux, and it is unclear what the future holds for the industry.

1. KILGORE, LEO...
2. ...
3. ...

greatly lessened the value of many of the clay loams and had indeed altered their character. The gray sandy soils, in turn, had eroded when placed under cultivation and their value for bright leaf production was in many cases greatly diminished by this time because of soil washing.³

Following the development of bright tobacco, production of the weed spread south and west from the older border tobacco counties of North Carolina. New marketing and manufacturing centers grew up at Durham, Winston-Salem, Reidsville, and elsewhere, and North Carolina began slowly to overtake Virginia in tobacco production. Between 1859 and 1879 tobacco production increased in all of the 21 North Carolina counties in the Tobacco and Mixed Farming Area, whereas the crop was increased in only 5 of the 19 Virginia counties, and three of these five counties were in the bright tobacco district. In several of the most northerly of the Virginia Southern Piedmont counties, where dark shipping tobacco continued to be the principal type raised, production has been smaller most of the time since the Civil War than it was in the antebellum period. The trend of tobacco acreage for the whole Area was almost steadily upward from 1879 to 1929, and production, although suffering occasional setbacks, in general followed the same pattern. (See Appendix No. I, Table No. 1.) Pre-Civil War production was not attained until the decade 1889-1899. The

3. W. L. Gibson, Farm Management Aspects of Soil Conservation on Flu-Cured Tobacco Farms in Virginia, V.P.I. Va. Agri. Expt. Sta. Bul. 327 (Blacksburg, Va., 1940), pp. 20-21.

...the ... of the ... in turn, had ... their value for bright ... of cold washing.

... the ... of the ... and manufacturing centers ... Winston-Salem, Raleigh, and elsewhere, and ... began slowly to overtake Virginia in tobacco production. Between 1899 and 1909 tobacco production increased in all of the North Carolina counties in the Tobacco and Mixed ... the crop was increased in only 5 of the 19 Virginia counties, and three of these five counties were in the ... In several of the west northern part of the ... the principal type raised, production has been ... for the whole ... and production ... in general fall was ... the ...

crop in the latter year was slightly over 15⁴ million pounds. The 1929 crop was 258 million pounds and that of 1939 was 335 million pounds. The area planted in 1879 was 149 thousand acres, compared with 401 thousand acres in 1929.

Bright tobacco cultivation displayed the same characteristics of pioneer agriculture that earlier had been exhibited in the case of Virginia dark tobacco or cotton. These characteristics included the non-conservative methods of cultivation as well as the manner in which the crop expanded areally in the continuous search for new lands. The crop had not become established in the border counties long before farmers having the desired sterile gray lands elsewhere in the Piedmont turned their attention to bright tobacco. For a time it appeared that the principal expansion would take place in the western Piedmont and even in the mountain districts of North Carolina. Stokes, Surry, and Forsyth counties became important producers before 1890, and in the 1870's and early 1880's experiments were made with the crop in Iredell, Catawba, Wilkes, and the transmontane counties. Meanwhile, complaints were expressed that it was becoming increasingly difficult to make good crops of fancy bright tobacco in Granville and the other older border counties because of drought or excessive rain, which supposedly caused frenching, firing, shedding, and other tobacco "diseases." Experienced tobacco raisers moved westward to localities where, according to their conception, climatic conditions were more favorable.⁴ Years later, as if in partial

⁴J. D. Cameron, A Sketch of the Tobacco Interests in North Carolina (Oxford, N. C., 1881), pp. 11-12, 22-29.

confirmation of the beliefs of the 1880's, scientific investigation disclosed that the Granville wilt, one of the principal scourges of the tobacco plant, had its center of infestation in the soil of the county giving the disease its name.⁵

Production of bright tobacco in eastern North Carolina started about the same time as in the western part of the state, and it was found that the Norfolk sandy loam and kindred soils of the Coastal Plain produced as good or better bright tobacco than the Piedmont soils. Near the turn of the century the old bright belt in the Piedmont began to lose its predominance to the Coastal Plain. In 1899 the North Carolina Piedmont counties still produced about 51 percent of North Carolina's crop of tobacco, but by 1929 the Piedmont accounted for only 35 percent of the crop of the state. The Coastal Plain portions of Georgia and South Carolina were added to the producing area when the boll weevil destroyed the cotton crop in those areas. During the exuberant period of expansion in the Piedmont a writer had boasted that the "treasure" of bright tobacco was almost the exclusive possession of North Carolina, adding that "It is a monopoly of the most magnificent kind; a monopoly of a production without a rival and of a market without a competitor ..."⁶ The story of later expansion southeastward into other states showed that in this case, as in that of many other commercial crops, a supposed regional monopoly is very precarious so long as there are other regions of

5. Garner, Prod. of Tobacco, p. 244.

6. Cameron, op. cit., p. 10.

similar soil or climate where the crop can be produced.

When the bright type became the principal object of attention among tobacco planters the cycle of development in tobacco cultivation was reversed. We have seen that in Virginia before the Civil War, intensive methods of cultivating dark tobaccos with the aid of manure and crop rotations had replaced the old dependence on virgin soil. Production of bright tobacco in the new period involved a return to extensive methods of culture in many respects. Gray land that was either in virgin timber or old field pine was preferred for the crop, although such land was in its best tilth about the third year after clearing, when the roots and stumps had been thoroughly cleared out. The methods of pulverizing the soil and preparing hills was similar to those used in former times. Barnyard manure might be applied to such new grounds, but it was generally considered too coarse. If used at all it was more often applied to old lands. Main reliance was placed in commercial fertilizer to supply the fertility naturally lacking in the soil.

Fertilizers might be home mixed or might be manufactured "complete" mixtures. The ingredients were nitrogen, phosphoric acid, and potash, and lime and soda were also recommended by some early authorities. A maximum of about 300 pounds of fertilizer per acre was thought sufficient.⁷ It was readily admitted that the

⁷Robert L. Ragland, "Tobacco. Preparation of the Plant Beds," Monthly Bulletin, North Carolina Department of Agriculture (January 1882), p. 4.

best tobacco lands were so infertile, either naturally or from previous cultivation, that commercial fertilizers were absolutely necessary. A recent writer has pointed out that "sand farming" in the laboratory with the use of properly mixed chemicals for plant food is alleged to be a modern discovery, although it has actually been practiced in the bright tobacco districts for some 60 years.⁸ Agricultural experiment station work in the last 40 years has shown that heavier applications per acre of fertilizer are more profitable in proportion than lighter, with the result that tobacco in more recent times received maximum applications of about 1000 pounds per acre of mixtures having ratios of 2-8-2 (2 nitrogen--8 phosphoric acid--2 potash), 3-8-3 or 3-8-5.⁹

The cultivator of fancy bright tobacco strives for quality of leaf rather than quantity per acre. In the decade of the 1870's the yield per acre in many areas decreased because of the change from dark shipping tobacco to bright. However many planters learned to increase the yield of bright tobacco without sacrificing quality.¹⁰ In the Tobacco and Mixed Farming Area as

8. Samuel Thomas Emory, Bright Tobacco in the Agriculture, Industry and Foreign Trade of North Carolina, Univ. of Chicago Ph.D. Dissertation, Dept. of Geography, 1939 (Chicago, 1939), p. 34.

9. S. W. Fletcher, "Notes From the Virginia Agricultural Experiment Station," Sou. Planter, 3rd ser., v. 73 (June 1912), pp. 690-691; W. L. Gibson, Economics of Flu-Cured Tobacco Farming, Va. Agri. Expt. Station, Tech. Bul. No. 66 (Blacksburg, 1940), p. 54; Soil Survey, Durham Co., N. C. (1924), p. 1364.

10. Killebrew, op. cit., p. 111.

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a whole, the average yield increased from about 500 pounds per acre in 1879 to about 640 pounds in 1929. Yields in the dark tobacco counties continued to be larger than in the bright districts.¹¹

Bright tobacco could not be adapted easily to a system of rotation with other crops. The incorporation of an excess of nitrogen into the soil by crop rotation lowered the quality of the leaf, and other plants nursed parasitic organisms that remained in the soil and attacked succeeding crops of tobacco. Progressive farmers soon learned that peas or clover preceding the tobacco crop would cause the leaves to spot and become rough.¹² It was later found that a wide variety of field crops, including corn, cotton, legumes, and potatoes favored the root knot disease in a following crop of tobacco, and some crops increased the incidence of Granville wilt and black shank.¹³ Individual farmers and experiment stations demonstrated that, contrary to prevalent belief, rotations could be introduced on tobacco fields. One such farmer of Henry County, Virginia practiced a rotation of tobacco followed by wheat, followed in turn by timothy and red clover for hay and pasture for three years.¹⁴ The Virginia

11.J. J. Vernon and M. J. B. Ezekiel, Causes of Profit or Loss on Virginia Tobacco Farms, Va. Polytechnic Institute Bul. No. 241 (Blacksburg, 1925).

12.G. L. Allen, "Practical Tobacco Growing," Prog. Farmer, v. 22 (March 28, 1907), p. 5.

13.Garner, op. cit., pp. 92-93, 241-244.

14.F. T. Hines, "Gaining a Reputation as a Farmer in Five Years," Prog. Farmer (Eastern Edition), v. 35 (June 5, 1920), p. 1164.

Experiment Station recommended a similar rotation extended to include corn and crimson clover for one year and cowpeas for one year.¹⁵ Rotations of three to five years, including corn, soybeans, and red top, have been found fairly effective in reducing the hazard of Granville wilt. The small grains, wheat, oats, and rye, followed by a seeding of red top on the heavier soils, are about the best crops to rotate with tobacco in the Piedmont. They furnish a winter cover crop to prevent erosion, they do not constitute a disease hazard, and they do not provide an excess of nitrogen. Principal reliance in combating tobacco diseases may in future be placed on several resistant strains of tobacco which have recently been developed.¹⁶

In spite of these advances, the average tobacco farmer remained chary of crop rotations on tobacco fields. The fields containing the better tobacco soils were often planted to the crop year after year without benefit of organic restoration or winter cover until erosion had taken too great a toll or until root knot or Granville wilt had infected the soil.

The plant had to be protected from excessive moisture, and the desire of the tobacco farmer to accomplish this seems to have retarded the adoption of some mechanical erosion control measures appropriate for clean-tilled crops. When bright tobacco was becoming established, the initial plowings of the field were often

15.S. W. Fletcher, loc. cit.

16.Garner, op. cit., pp. 94, 244.

... recommended a similar rotation extended to 12-
... 12-13 years, including corn, soy-
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followed by a final plowing across the first furrows to give a finer tilth. The plants were set in large hills, but better farmers advised row cultivation on the contour for undulating lands. Contour cultivation was eventually adopted, the hills were eliminated and the plants more closely spaced. Progressive crop masters also advised "water furrowing," a form of hillside ditching, to retard erosion.¹⁷ The bright tobacco districts, however, lagged behind the cotton districts in the development of terracing. Virginia, where hillside ditching and terracing were in use long before the Civil War, did not keep pace with later developments elsewhere.¹⁸ (See Chapter VII.)

The observations regarding the lack of rotation and cover crops on tobacco land do not apply to the dark tobacco districts of Virginia. Here the rotations of tobacco with clover, grass, and wheat continued to be practiced as before the Civil War.¹⁹

General Crops and Livestock

There has been an increasing concentration on the two principal money crops, tobacco and cotton, since the Civil War, while

17. Robert L. Ragland, On the Cultivation and Curing of Tobacco, and More Particularly of Fine Yellow Tobacco (Richmond, 1872), p. 7; [R. B. Davis], "Tobacco. How to Manage it. From the Plant Bed to the Warehouse," Prog. Farmer, v. 1 (March 31, 1886), p. 1.

18. Gibson, op. cit., p. 60.

19. Southern Fertilizer Co., How Tobacco is Raised and Prepared for Market (Richmond, n. d. [ca. 1874]), p. 18.

the principal grain crops, corn, oats, and wheat, have declined in acreage and production. The total acreage of corn, wheat, and oats decreased 39 percent between 1879 and 1929. The area in tobacco increased 170 percent in this period and that in cotton, 33 percent. On the other hand there was a notable improvement in the yield per acre of all crops. (See Table No. 1.) As a result, there was more corn and wheat produced at the census dates 1929 and 1939 than in 1879, in spite of declining acreages in both of these crops. The corn crop had recovered its pre-Civil War status by 1879, and since the latter date production has varied from over 13 million bushels to about 17 million. The peak production of wheat, over 4 and one-half million bushels, made in 1859, has not been attained again since that date. Of the principal crops, oats experienced the greatest decrease. The crop of over 3 million bushels in 1879 compares with that of 340,488 bushels in 1929. From 1879 to 1929, however, there was an increase of over 250 percent in the area devoted to hay, and increases since 1929 have been even greater. (See Appendix No. II, Table No. 1.) The tendency to increase the tobacco area and to cut down on the area devoted to other crops continued after 1929, especially after acreage control of tobacco was voted down by the farmers in 1939. On the other hand the area of pasture has increased. (See Table No. 2.)

The following table shows the percentage of the total area of the country which was planted with cotton in 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2

Table No. 1

Tobacco and Mixed Farming Area
Yield Per Acre of Principal Crops

| | | <u>1879</u> | <u>1899</u> | <u>1929</u> | <u>1939</u> |
|---------|-----|-------------|-------------|-------------|-------------|
| Corn | bu. | 13.5 | 15.6 | 17.5 | 19.8 |
| Cotton | lb. | 211 | 200 | 230 | 248 |
| Oats | bu. | 7.5 | 8.7 | 17.9 | 23.6 |
| Tobacco | lb. | 518 | 599 | 643 | 841 |
| Wheat | bu. | 6.1 | 6.4 | 10.7 | 12.0 |

By the post-bellum period the more progressive farmers had ceased to plant corn in "checks". The crops were planted in rows some 4 to 6 feet apart on the contour. According to the most approved methods, the land was broken deeply with heavy two-horse plows and the later cultivation was only deep enough to stir the surface and kill the weeds. The land was cultivated "flat", that is, without deep furrows between the rows, in order to prevent the collection of excess water. Before the turn of the century multiple-tooth cultivators and disk harrows were in use on the more advanced farms where the owners could afford more expensive equipment. Nevertheless for the tenant and the one-horse farm owner with small capital, many of the older practices were still in vogue far into the present century. The antiquated Georgia stock with the bull tongue, scooter, and sweep were the standard

TABLE 1
Yields and Soil Moisture
in the First Half of the Growing Season

| Year | 1951 | 1952 | 1953 | 1954 | 1955 |
|--------|------|------|------|------|------|
| Wheat | 1.2 | 1.1 | 1.0 | 1.1 | 1.2 |
| Barley | 1.1 | 1.0 | 0.9 | 1.0 | 1.1 |
| Oats | 1.0 | 0.9 | 0.8 | 0.9 | 1.0 |
| Rye | 1.1 | 1.0 | 0.9 | 1.0 | 1.1 |
| Grass | 1.2 | 1.1 | 1.0 | 1.1 | 1.2 |

of the post-harvest period the more progressive farmers had begun to plant corn in "chucks". The crops were planted in rows 4 to 6 feet apart in the summer. According to the data given in the table, the land was broken deeply with heavy two-furrow plows and the later cultivation was only deep enough to stir the surface and kill the weeds. The land was cultivated "free", that is, without deep furrows between the rows, in order to prevent the collection of excess water. Before the turn of the century multiple-row cultivation and the summer fallow were common. Now instead of the rows the entire field is left bare throughout the summer. Experiments for the winter and the two-year time have been carried out, and it has been found that the yield is very high when the land is left bare. The cultivated fields in 1955 are the best in the present century. The cultivated fields which with the fall plow, harrow, and seed were the standard

Table No. 2
Comparative Acreage in selected crops
or land use
Five Virginia and North Carolina Counties

| | <u>1934</u> | <u>1939</u> |
|---|-------------|-------------|
| Cotton | 24,465 | 13,161 |
| Tobacco | 54,557 | 85,942 |
| Corn ¹ | 147,216 | 144,604 |
| Small grains ² | 72,915 | 54,830 |
| All hay | 60,591 | 83,344 |
| Plowable pasture | 94,528 | 120,338 |
| Potatoes ³ | 10,190 | 8,477 |
| Annual legumes ⁴ | 27,786 | 19,368 |
| Vegetables for sale | 4,104 | 2,082 |
| Tree fruits, nuts, vineyards ⁵ | 7,344 | 5,793 |

1.Corn for all purposes.

2.Oats (incl. cut and fed unthreshed), barley, rye, wheat.

3.Irish and sweet.

4.Grown alone--soybeans, cowpeas, peanuts, vetches, velvetbeans, mung, and horse beans, etc.

5.Excludes nurseries. (Data for 1935 and 1940)

TABLE NO. 1
 COMPARATIVE SUMMARY OF THE
 1954-55 AND 1955-56
 CROP YIELDS AND TOTAL PRODUCTION

| Crop | 1954-55 | 1955-56 |
|-----------------------|---------|---------|
| Wheat | 12,303 | 20,400 |
| Barley | 10,000 | 10,000 |
| Maize | 100,000 | 100,000 |
| Other Cereals | 10,000 | 10,000 |
| ALL CEREALS | 132,303 | 220,400 |
| Oilseeds | 10,000 | 10,000 |
| Vegetables | 10,000 | 10,000 |
| Animal Products | 10,000 | 10,000 |
| Other Products | 10,000 | 10,000 |
| Vegetables and fruits | 10,000 | 10,000 |
| Other Products | 10,000 | 10,000 |

1. Data for all purposes.
2. Data for all and for unimproved, barley, rice, wheat.
3. Data for all.
4. Data for all, including, oilseeds, vegetables, fruits, and other products.
5. Data for all, including, oilseeds, vegetables, fruits, and other products.

implements on their farms.²⁰ The land on such farms was often plowed about 4 inches deep with such an instrument pulled by a steer, and the corn was planted on a ridge two furrows wide. The after-cultivation was such that the ridge was made even higher and narrower.²¹ Cultivation was deeper than necessary, and the old superstition about the necessity of cutting the roots seemed still to be in evidence. The complaint was still made, as in antebellum days, that the corn crop was allowed to suffer because too much attention was given to the tobacco.²²

The proper kind and amount of fertilizer to be applied to corn seems to have been a matter of doubt for a long time. Greater attention was given to the application of commercial fertilizers to tobacco, and the early experiments with guano had yielded fewer definite results on corn than on wheat. When the complete fertilizers were put on the market they were used on corn as on other crops. In the 1920's it was customary to fertilize corn at rates varying from 100 to 400 pounds per acre of 2-8-2 or 3-8-3, and 4-8-4 mixtures, but if corn was grown in rotation with other crops an application of acid phosphate alone might suffice.

20. Anon., "Cultivation of Corn," by Country, Sou. Planter, 3rd ser., v. 63 (April 1902), p. 204; T. O. Sandy, "Corn Growing in Southside Virginia," Sou. Planter, 3rd ser., v. 68 (April 1907), p. 331; F. R. Jones, "Riding Cultivators," Prog. Farmer, v. 40 (Jan. 24, 1925), pp. 104-105.

21. J. H. Harpster, "Primitive Farming in Virginia," Breeder's Gazette, v. 40 (July 17, 1901), p. 76.

22. Anon., "Corn Culture--Practical Hints," by J. W. V., Prog. Farmer, v. 1 (April 7, 1886), p. 1.

Nitrate of soda was frequently used as a side dressing. Some farmers used manure on corn land and others no fertilizing ingredient of any kind.²³ The average production per acre of corn increased from 13.5 bushels per acre in 1879 to 17.5 in 1929.

(See Table No. 1.)

Wheat and the other small grains were grown in rotation with corn, legumes, and grasses. Samples of such rotations were: (1) first year corn, second year rye and clover, third year clover, fourth year wheat; practiced in Amelia County, Virginia, in the 1880's; (2) first year cotton, second year corn interplanted with peas, third year wheat followed by peas; practiced in Wake County, North Carolina, at the turn of the century; (3) wheat followed by clover, a rotation in fairly wide use.²⁴ When grown in rotation with the legumes, the small grains secured most of their nitrogen requirements from them, so that phosphorus and potassium were the principal plant foods required from commercial fertilizer. These were supplied at first by ground bone and kainit. Later, however, some farmers used complete fertilizers of some popular grade such as 3-8-3 on wheat.²⁵

23. Soil Surveys, Durham County, N. C. (1924), Davie Co., N. C. (1927), Chatham Co., N. C. (1933), Franklin Co., N. C. (1931), Wilkes Co., N. C. (1921).

24. G. B. Stacy, "Amelia Plantation Observations," Sou. Planter, 3rd ser., v. 42 (May 1881), pp. 291-293; J. L. Banks, "How Peas and Proper Crop Rotation Have Benefited One Farmer," Prog. Farmer, v. 15 (May 22, 1900), p. 1; C. J. Doggett, "Rotation of Crops," Sou. Planter, 3rd ser., v. 64 (Feb. 1903), p. 8.

25. Soil Survey, Chatham County, N. C. (1933), p. 16.

Some of the most frequently used as a side dressing. Some

farmers used manure on corn land and others no fertilizing in-

cluding the use of lime. The following table shows the

amount of fertilizer used per acre in 1913 to 1914 in 1915.

(See Table No. 1.)

Wheat and the other small grains were grown in rotation with

corn, legumes, and grasses. Samples of each rotation were: (1)

first year corn, second year corn, third year corn, fourth

year corn, wheat; practiced in Amelia County, Virginia, in the

first year corn, second year corn, third year corn, fourth

year, corn, wheat followed by peas; practiced in Wake County,

North Carolina, at the end of the fourth year; (2) wheat, corn, and

clover, a rotation in North Carolina; (3) corn, wheat, and

clover, the small grains secured most of their nitrogen

from the legumes, the corn from the manure and fertilizer. These

rotations were followed from commercial fertilizer. These

rotations were followed from commercial fertilizer. These

rotations were followed from commercial fertilizer. These

in 1913 to 1914 in 1915.

Table No. 1. Fertilizer used per acre in 1913 to 1914 in 1915.

Table No. 1. Fertilizer used per acre in 1913 to 1914 in 1915.

Table No. 1. Fertilizer used per acre in 1913 to 1914 in 1915.

After the completion of through rail connections with the trans-Allegheny region immediately before the Civil War and in the 1870's, Virginia wheat came into competition with that from the West. Agricultural writers complained gloomily that the areas to the east of the mountains, with their depleted soils, could not meet this competition because of the expense of fertilizers, and urged farmers to turn to winter oats, hay, and stock feeding as substitutes for wheat.²⁶ Actually, oats production suffered a greater decline than that of wheat in the post-bellum period. Farther south the wheat crop was neglected in favor of tobacco. W. F. Massey recalled in 1920 that the Bluestem variety of wheat had once been cultivated in the North Carolina-Virginia border area, but that it had gone out of use because the farmers had turned to bright tobacco culture.²⁷ Although subject to these different forms of competition, and lacking a large market, the small grains continued to be cultivated in sufficient quantity for use as cover crops and for home consumption. The per acre production of wheat nearly doubled in the period 1879-1939, increasing from 6.1 bushels to 12 bushels. Oats production per acre increased in the same period from 7.5 bushels to 23.6 bushels.

Cowpeas and other varieties of field peas were articles of

26. Anon., "Notes for the Month," Sou. Planter, 3rd ser., v. 36 (Sept. 1875), pp. 536-537; Anon., "More Oats," by Culpepper, Sou. Planter, 3rd ser., v. 36 (Dec. 1875), pp. 680-682.

27. W. F. Massey, "Notes From a Maryland Garden," Rural New Yorker, v. 79 (Oct. 9, 1920), p. 1577.

After the completion of through rail connections with the
 trans-Alberta system themselves, however the rail was in
 the 1970's, Alberta was not then considered as a main line
 line. Agricultural writers complained bitterly that the
 system at that time of the country, with their political allies,
 could not meet this transportation demand of the system of trans-
 Alberta, and again transport to and from Alberta, and, in some
 instances as well as the main line, the country, and the
 railway a further decline than that of those in the post-war
 period. Further south the wheat crop was neglected in favor of
 livestock. V. V. Sauer testified in 1970 that the livestock raising
 of wheat had been neglected in the North American continent
 because wheat, not that it had been that of the farmers
 had turned to bright tobacco culture. Although subject to
 these different forms of neglect, and having a large market
 the wheat production in the province is still a dominant force
 only for use as a source of food and for some transportation. The
 wheat production of some wheat raising in the period 1970-1975,
 increasing from 5.1 bushels to 12 bushels. Cattle production has
 also increased in the same period from 7.5 bushels to 12.5
 bushels.

Changes in the production of wheat were evident in

10. Sauer, "Wheat and the West," *Journal of the American Historical Association*, 72 (1967), pp. 500-502.
 11. Sauer, "Wheat and the West," *Journal of the American Historical Association*, 72 (1967), pp. 500-502.
 12. Sauer, "Wheat and the West," *Journal of the American Historical Association*, 72 (1967), pp. 500-502.

diet for man and beast on the farm at a very early period. With the coming of the agricultural reform movement pea crops began to be considered as soil builders. Edmund Ruffin advocated the plowing under of peavines for "green manure," thus precipitating a long debate regarding the relative merits of turning the crop under in various stages of growth or allowing it to be "hogged off" before turning under the residue.²⁸ If grown alone, the pea vines were sometimes plowed under completely after the peas were harvested, but other farmers preferred to mow them for hay and turn under the stubble.²⁹ Pea culture for manuring purposes does not seem to have been as prevalent in Southside Virginia and in the North Carolina Piedmont as it was north of the James River or in eastern Virginia and Carolina in the late nineteenth century.³⁰ It was rather widespread, however. Peas were grown alone, in rotations, or interplanted in alternate rows with corn. Before commercial fertilizers became abundant the nitrogen derived from peas was considered a partial substitute for manure, or in periods when fertilizers were considered too expensive to be used

28.[T. L. Payne], "Pea Fallow," Sou. Planter, 3rd ser., v. 39 (April 1878), pp. 173-176; [T. L. Payne], "Green Fallow Crops, Animal Manures and Commercial Fertilizers," Sou. Planter, 3rd. ser., v. 40 (Oct. 1879), pp. 546-548.

29.Anon., "The Pea as a Renovator," Maryland Farmer, v. 19 (Oct. 1, 1882), pp. 306-307; R. W. Scott, "The Improvement of Our Worn Out Soils," Bul. N. C. State Board of Agri., v. 26, (Oct. 1905), pp. 21-23.

30.J. O. McGehee, "Pea Fallow," Sou. Planter, n. s., v. 7 (Aug. 1873), pp. 364-366; T. B. Parker, "The Fertilizer Question," Prog. Farmer, v. 14 (March 21, 1899), p. 1.

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"This item was a Remington-Union V. L. R. F. No. 1000." (S)

profitably it was urged that more peas be planted.³¹

The principal leguminous field crops available to the Southern farmer until near the close of the nineteenth century were field peas and red clover. Two other legumes were introduced about this time. Crimson clover began to attract public notice around the late 1880's, when the North Carolina Experiment Station used it in rotation with ensilage corn to rebuild an old field. By sowing the clover in the fall and plowing it under in the spring the productivity of the field was raised from about five bushels of corn per acre to about 40 or 50 bushels.³² Before many years the use of crimson clover for a winter cover crop, spring grazing, and hay was widespread.³³ Soy beans, or "soja beans," as they were called at first, were being planted to some extent in the 1890's, and by the third decade of the present century were used rather widely for hay and as hog pasture.³⁴

The area continued to labor under the colonial handicaps to animal industries until well after the Civil War. The states retained laws on their statute books designed for a society in

31. Anon., "Rotation of Crops," by Pea Vine, Sou. Cult., 1st ser., v. 32 (March 1874), pp. 84-85.

32. F. W. Massey, "Renovating Worn-Out Land," Sou. Cult., v. 50 (Nov. 1892), p. 537.

33. B. Irby, "Crimson Clover (Annual or German Clover)," Prog. Farmer, v. 14 (Sept. 19, 1899), p. 1; C. M. Stacy, "Good Plowing and Its Results," Sou. Planter, 3rd ser., v. 72 (Aug. 1911), pp. 853-855.

34. L. M. Thayer, "Soja Beans," Sou. Planter, v. 59 (April 1898), pp. 159-161; Anon., "Progressive North Carolina Counties," Prog. Farmer, v. 40 (Mar. 14, 1925), p. 344.

...to the west and more to the north. The principal agricultural crops available to the north-
 and south were the clover of the nineteenth century were
 field peas and red clover. Two other legumes were introduced
 about this time. Crimson clover began to attract public notice
 around the late 1880's, when the North Carolina Experiment Station
 found it to be superior to the other legumes then available in the
 state. By 1890 the clover in the state was found to be superior
 to the other legumes. The productivity of the field was raised from about
 five bushels of corn per acre to about 40 or 50 bushels.¹² Before
 this time the use of crimson clover for a winter cover crop
 was not known, and it was not until the late 1890's that it was
 found that it was better than the other legumes then available in the
 state. It was called at first, "winter wheat," and being planted in some
 places in the 1890's, and by the third decade of the present cen-
 tury was used rather widely for hay and as hog pasture.¹³

The first mention in the literature of the use of crimson clover for
 a winter cover crop is in the report of the North Carolina Experiment
 Station for the year 1890-1891. The report states that the clover
 raised 1890-1891 on their separate plots designed for a clover in

12. A. J. Cook, "The Use of Crimson Clover," *North Carolina Experiment Station Report*, 1890-1891, p. 10.
 13. A. J. Cook, "The Use of Crimson Clover," *North Carolina Experiment Station Report*, 1890-1891, p. 10.
 14. A. J. Cook, "The Use of Crimson Clover," *North Carolina Experiment Station Report*, 1890-1891, p. 10.
 15. A. J. Cook, "The Use of Crimson Clover," *North Carolina Experiment Station Report*, 1890-1891, p. 10.
 16. A. J. Cook, "The Use of Crimson Clover," *North Carolina Experiment Station Report*, 1890-1891, p. 10.
 17. A. J. Cook, "The Use of Crimson Clover," *North Carolina Experiment Station Report*, 1890-1891, p. 10.
 18. A. J. Cook, "The Use of Crimson Clover," *North Carolina Experiment Station Report*, 1890-1891, p. 10.
 19. A. J. Cook, "The Use of Crimson Clover," *North Carolina Experiment Station Report*, 1890-1891, p. 10.
 20. A. J. Cook, "The Use of Crimson Clover," *North Carolina Experiment Station Report*, 1890-1891, p. 10.

which the keeping of livestock on the open range was of major importance, although crop production had long since become of more importance in the Piedmont region, and although it was claimed that the number of animals had decreased in the early nineteenth century following the development of tillage.³⁵ Stock was allowed to roam at will with little attention, while the planter was required to expend labor and timber building fences to protect his crops. The prevalence of cattle tick fever, the range method of keeping stock, and the major amount of time spent in producing tobacco and cotton militated against improvements in breeds and resulted in a preponderance of scrub stock. For the same reason few attempts were made to improve pastures or produce hay. There were exceptions to these general statements, however. The general farming district centering in Forsyth, Guilford, and Davidson Counties, North Carolina, in the antebellum period prided itself on its good stock and meadows.³⁶ Progressive farmers elsewhere kept improved herds and sowed red top or herds grass for pastures and erosion control.

A beginning was made in eastern Virginia in the 1850's toward changing the antiquated fence laws, by the device of allowing all the land owners in a locality to erect a single fence embracing the whole of their properties and doing away with individual

35. W. C. Nichols, in Memoirs of the "Society of Virginia for Promoting Agriculture" (Richmond, 1818), p. 108.

36. Ralph Correll, Address to the Farmers of Guilford, February 19, 1852 (Greensboro, N. C., 1852).

which the keeping of livestock on the open range was at once the
 permanent, although every production had long since become of some
 importance to the livestock industry, and although it was almost
 that the number of animals was increased in the early nineteenth
 century following the development of agriculture. It was not until
 about 1850 that the first cattle ranches were established.
 was required to expand labor and finance building houses, to pro-
 vide the capital. The prevalence of cattle tick fever, the rapid
 method of marketing stock, and the major amount of time spent in
 protecting animals and often utilized against improvements in
 breeds was devoted in a proportion of some stock. For the
 most part the animals were sold to buyers, sometimes on payment
 of a commission to the owner, and sometimes on consignment.
 The general raising of stock continued in the United States, and
 particularly in the North Carolina, in the antebellum period.
 raised itself as the great stock and market. The
 one element kept improved herds and sowed red top or hard
 grass. The pasture and erosion control.
 A beginning was made in the late 1850s in the United States
 changing the traditional range land, by the means of allowing all
 the land owners in a locality to erect a single fence enclosing
 the whole of their properties and dealing only with individual

U.S. National Archives, in the Department of Agriculture, Bureau of
 Animal Industry, Division of Livestock, 1911, p. 10.
 U.S. National Archives, in the Department of Agriculture, Bureau of
 Animal Industry, Division of Livestock, 1911, p. 10.

fences within the larger enclosure.³⁷ With the liberation of the slaves an additional argument was given for changing the old system, for farmers found themselves without sufficient labor to keep up the fences and tenants could not be expected to build or repair fences on land that did not belong to them. By a series of acts beginning about 1876 the North Carolina legislature permitted individual counties or townships to take measures to fence in the stock instead of the crops. By 1896 practically all of the Piedmont counties had taken advantage of these laws, although the open range continued to exist in the more sparsely inhabited flat woods and mountain sections for many years. The results were great savings in the time and expense required for fencing, the elimination of one source of depletion of the forests, and better attention to cattle and hogs.³⁸

The scourge of the cattle tick was eliminated by the work of the United States Department of Agriculture. By 1884 D. E. Salmon and his associates of the Department had established the fact that

37. Virginia General Assembly, "An Act to Authorize Voluntary Associations of Individuals for Fencing their Lands in Common," Sou. Planter, 3rd ser., v. 18 (March 1858), pp. 169-170; Edmund Ruffin, Jr., William M. Tate, Richard Irby, "Report to the Farmers' Assembly on the Law of Enclosures," loc. cit., pp. 170-174.

38. [North Carolina], Report of L. L. Polk, Commissioner of Agriculture, for 1877 and 1878, Pub. Doc. No. 8, sess. of 1879 (n. p., n. d.), pp. 23-26; North Carolina Dept. Agri., Monthly Bulletin, v. 18 (Oct. 1896), p. 6; Robert W. Best, "Woodman, Spare That Tree. How the American Forests Are Disappearing," Prog. Farmer, v. 1 (March 3, 1886), p. 3; Anon., "Fences," Prog. Farmer, v. 1 (Oct. 20, 1886), p. 4.

practically all of the Southern Piedmont was included in the area permanently infected by tick fever.³⁹ A solution in which cattle could be dipped to kill the ticks was developed, and in 1906 the work of wholesale eradication started. By 1922 all of Virginia and South Carolina had been cleared of the disease, and it was to be found in North Carolina and Georgia only in the east.⁴⁰

There was a slow increase in the keeping of livestock. The post-bellum urbanization in the Piedmont created a home market for meat and animal products and acted as a mild stimulant to livestock industries near the towns. The complaint was often expressed, nevertheless, that too much western beef and butter were imported into the region for sale not only in the towns but even on the farms, while the farmers concentrated on tobacco and cotton.⁴¹

Creameries and cheese factories have been established in increasing numbers since the 1920's. In spite of continued emphasis on the traditional cash crops, many areas have shown a marked increase in the sale of milk from farms since 1910. (See Appendix No. IV.) The raising of beef cattle continued to be limited to larger farmers with sufficient capital. As late as

39.U. S. Commissioner of Agriculture, Report for the Year 1884 (Washington, 1884), pp. 252-258. Cited hereafter as U. S. Com. Agri., Report, [year].

40.Rupert B. Vance, Human Geography of the South (Chapel Hill, N. C., 1935), pp. 160-161.

41.Anon., Prog. Farmer, v. 1 (Feb. 17, 1886), p. 4; Carl C. Taylor, "Tar Heel Talks," Sou. Planter, 3rd ser., v. 88 (Feb. 15, 1927), pp. 31-32.

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1940 the keeping of cattle was not sufficiently profitable to the average farmer to justify large scale expansion at the expense of tobacco.⁴² At the same time that cattle were increasing the numbers of hogs and sheep were suffering a relative decline. (See Appendix No. IV.) The suggestion advanced at various times after the Civil War that the large amounts of vacant land should be devoted to sheep raising remained but a suggestion.⁴³

The difficulty of finding suitable pasture and meadow grasses and legumes for the area was one limiting factor in stock production. The necessity of keeping clean-tilled crops free from grass made the southern farmer a natural enemy of it, and this fact may have been as responsible as the southern climate for the poor condition of pastures. Some farmers believed that "our lands under the clean cultivation of cotton and corn ... having been largely depleted of their plant food and further impoverished by the inevitable washing ... are too poor to make grass," and relied upon pea vines and corn fodder to keep stock.⁴⁴ Others, however, were successful in securing good stands of timothy, orchard grass, blue grass, red top, and the clovers, and occasionally champions were found for such notorious enemies of clean cultivation as

⁴²Gibson, op. cit., pp. 49-50.

⁴³James Newman, "To Utilize Waste Lands--Sheep," Sou. Planter, 3rd ser., v. 41 (March 1880), pp. 131-132.

⁴⁴R. H. Lewis, "Ensilage--Its Value," Prog. Farmer, v. 1 (March 17, 1886), p. 2.

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Johnson grass and Bermuda.⁴⁵ A few were successful with small lots of alfalfa, but it would not flourish generally on the clay soils of the Piedmont.⁴⁶ Even the lowly broom sedge which clothed worn out and gullied fields was succulent enough in spring if the old growth were burned off. Japanese clover (lespedeza striata) proved to be a boon to pastures after its introduction. It appears to have become established around Charleston, S. C. about 1840 from an accidental importation from China or Japan. By about 1870 it had spread through North Carolina. It enriched the forage of unimproved old field pastures. Its habit of growth is so low that it is difficult to cut for hay, and at present it is somewhat eclipsed by its larger cousins, Korean and Kobe lespedeza, but contemporary accounts assure us that at the time of its introduction it was regarded as a great improvement over the native pasture plants.⁴⁷ Korean lespedeza was introduced by the Department of Agriculture about 1923 and is used widely as a cultivated crop in rotation with corn and the small

45. J. Bird, "The Grasses," Prog. Farmer, v. 2 (May 19, 1887), p. 4; A. Graves, "A Good Word For Bermuda Grass," Prog. Farmer, v. 2 (Oct. 27, 1887), p. 4; T. O. Sandy, "Hay Production in Southside Virginia," Sou. Planter, 3rd ser., v. 66 (Aug. 1905), p. 595.

46. James Norwood, "Essay on Grass Culture, And the Accumulation and Management of Stable and Barnyard Manure, &c., Before the Orange County Alliance No. 1," Prog. Farmer, v. 4 (May 7, 1889), p. 4.

47. T. S. W. Mott, "The Lespedeza Striata, or Japan Clover," Reconstructed Farmer, v. 2 (March 1871), pp. 321-324; Anon., "Japan Clover," by J. W. W., Sou. Planter, v. 44 (April 1883), pp. 185-186.

grains, and alone for hay and land improvement. Other varieties of lespedeza have been developed and used since the institution of the Soil Conservation program in 1934.

Post-Civil War Readjustments:
Tenancy, the Immigration Movement, Population Growth

The emancipation of the slaves destroyed the greater part of the capital of the Southern farm owner and in many instances his cash, sunk in Confederate securities or currency, had vanished also. He was left in 1865 with only land and a gravely depleted supply of farm tools and equipment to begin operations anew. The former slave, on the other hand, had only his labor as an asset. Out of this situation of scarcity of working capital but relative abundance of land and labor developed the system of share cropping and tenancy that has been the curse of Southern agriculture ever since. This system did not fasten itself so completely upon Virginia as upon the states farther south. In the cotton and bright tobacco districts of both Virginia and North Carolina, however, it increased. In 1880 the proportion of farms operated by tenants or croppers in ~~Virginia~~ was 29.6 in Virginia and 33.4 in North Carolina. By 1930 these proportions were 28.1 and 49.2 respectively. In the whole of the Tobacco and Mixed Farming Area the number of counties in which over half of the farms were operated by non-owners was 4 in 1880, but had increased to 12 out of a total of 43 in 1930. These counties were for the most part in the old parts of the bright tobacco district or in the cotton-

producing district.

The substitution of tenancy and cropping in the place of slavery was viewed by contemporaries as only one phase of the necessary readjustment of Southern agriculture after the Civil War. At the end of the war there were great quantities of idle land--much more than could be placed in cultivation by the joint efforts of owners without liquid capital and laborers unused to working as freedmen. There was some disposition to attribute the idle land to the war itself, but in the Piedmont at least, the war only aggravated a situation that, as we have seen, had existed for many decades previously.⁴⁸ It was hoped that small farms tilled by immigrants from the North or Europe, could be created from the idle lands and that these would exist side by side with the plantations tilled by negro tenants.⁴⁹ It was thought in some quarters that the free negro was unreliable, and it was hoped that he would be replaced by immigrant white labor.⁵⁰ The scarcity of labor was aggravated by the movement of former slaves to the southern and western states. Virginians and North Carolinians blamed "agents from the cotton-producing states" for "enticing" away the negroes, or attributed the movement in part

48. Robert Somers, The Southern States Since the War, 1870-1 (London, 1871), p. 13.

49. Charles B. Williams, "Virginia State Agricultural Society," Sou. Planter, n. s., v. 1 (Feb. 1867), pp. 21-51.

50. Tarboro Southerner, as quoted in Prog. Farmer, v. 2 (Oct. 20, 1887), p. 4.

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to the disturbed political conditions of Reconstruction.⁵¹

Especially hard-hit were the central parts of Virginia, that is, the northern part of the region here under discussion. Depicting these areas in an extremely pessimistic tone, one writer declared that:

... except in the river valleys ... you will see farms formerly the seats of ease and comfort, in every state of sterility and dilapidation; the enclosures and buildings rolling down; orchards full of moss and dead branches; fields covered with broom sedge, poverty grass, briars and gulleys. Many of these places have been abandoned to a miserable tenant system and a bad class of tenants. On many others the owners reside and have to live upon their products.⁵²

Because of the general air of optimism created by the new bright tobacco industry farther south, the need for immigrants seems to have been less felt there. Nevertheless both Virginia and North Carolina created state agencies to encourage immigration. Virginia established a Board and a Commissioner of Immigration in 1866, and North Carolina, eleven years later, formed a Board of Agriculture, Immigration and Statistics. These agencies designated individuals abroad and in the North to advertise the states and deal with prospective newcomers. A large body of descriptive literature was published aimed at attracting the

51. William H. Richardson, "Immigration," Sou. Planter, n. s., v. 4 (Jan. 1870), pp. 16-24; Anon., "The Exodus Movement. A Republican Plot and its Object," Weekly News (Raleigh, N. C.), v. 8 (Dec. 9, 1879).

52. A. H. Perkins, "Improvement of Worn Out Lands," Sou. Planter, 3rd ser., v. 38 (July 1877), pp. 447-449.

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... in the river valleys ... you will see some formerly
the state of ease and comfort, in every state of society and
the enclosure and buildings falling down or ruined
all of them are now in ruins; fields covered with brown sods,
everywhere, and the only of these houses have
been reduced to a few ruins and a few
left. The only others the owners reside and have to live upon
their estates.

The above was dealt with prospective members. A large body of

the assigned individuals stood and in the early afternoon

a band of soldiers, Indian and American, were again

ordered in 1860, and North Carolina, where they later found

them. Virginia established a band and a headquarters at Fort-

and North Carolina covered great regions of mountainous land-

which have been left there. Nevertheless both Virginia

which covers almost forty miles, the same for the Indians.

between as the general air of opinion crossed by the new

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Worn Out Hands

immigrant. Regional immigration conventions were held from time to time. Small groups of immigrants settled in different parts of the Piedmont, and some of them made significant contributions to the agriculture of the region, but their number in the aggregate was not large.⁵³ The class of small independent white farmers could not grow in competition with the tenant-cropping system under the prevailing staple crop conditions. Nor were immigrants interested in depleted Piedmont farms, no matter how cheap, when fresh lands elsewhere were available. The area of idle land in the Tobacco and Mixed Farming Region remained large for about a decade and one-half after 1865. The expansion in cultivation which took place after 1880 (which was indeed rather small) was brought about by the increasing native population rather than by immigrants. (See Appendix No. II, Table 4.)

Disillusionment regarding the prospects of the immigration movement began to be expressed in the middle 1870's. One writer suggested that since native labor was unreliable and the prospects of selling surplus lands to outsiders were not bright, the best use for such lands was to cut the timber and pen cattle upon them.⁵⁴ Another commentator in 1894 was exasperated by so much planning and oratory and so few results. He contended that emigration from Virginia farms was far greater than could ever be

53. B. W. Arnold, Jr., History of the Tobacco Industry in Virginia from 1860 to 1894. Johns Hopkins Univ. Studies, 15th ser., nos. 1-2 (Baltimore, 1897), pp. 49 ff.; Joseph Frank, "Crops and Rotations for Small Farms in Southside Virginia," Sou. Planter, 3rd ser., v. 60 (Sept. 1899), pp. 426-427.

54. J. A. Flippo, "A Live Post Fence," Sou. Planter, 3rd ser., v. 37 (July 1876), pp. 468-470.

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replaced by immigration. If Virginians wished to attract immigrants, he said, they must increase crops and improve their farms, but so long as they were "satisfied with a wind diet ... broom-straw and old field pines will increase and immigration will go elsewhere."⁵⁵ State agencies continued to foster immigration after the 1890's, with modest results, but the high hopes of earlier decades were no longer present.

In spite of migration from the region to other parts of the country, and the failure of the immigration movement, the farm population increased. The rural population in the Tobacco and Mixed Farming Area increased from 576,682 in 1860 to over 1,000,000 by 1930. The growth between 1860 and 1940 was about 88 percent. The increase was continuous from decade to decade, although in the periods 1860-1870 and 1920-1940 there was slower growth than for the entire period. It will be observed that this growth between 1860 and 1940 was less than in the period 1790-1860, when the increase was 97 percent. Out-migration continued as before the Civil War, and the region's contribution to other sections of the country continued to exceed the population acquired from other sections. To this older form of out-migration was now added the new country-to-town migration. In 1870 there were three urban centers in the Tobacco and Mixed Farming Area having over 5,000 inhabitants. In 1940 there were 17 such towns and cities. The small trading centers along the railways and the court house villages of antebellum days grew to sizeable cities as the tobacco, textile, furniture, and other

55. Lewis H. Blair, "Immigration," Sou. Planter, 3rd ser., v. 55 (Nov. 1894), pp. 561-562.

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industries increased in importance. This type of migration, however, built home markets for the agriculture of the region instead of being a complete loss as was the inter-regional migration. A group of Virginia counties at the northern end of the area experienced an absolute decline in rural population in the post-bellum period, having fewer inhabitants in 1940 than in the decades 1860-1880. Most of the other Virginia counties of the area and the northeastern counties of the North Carolina Piedmont enjoyed only moderate growth in rural population. Growth was greater in the central North Carolina counties. (See Appendix No. III, Maps No. 6 and 7.)

Agricultural Organization

The period from 1865 to about 1890 was characterized by the development of new forms of agricultural organization. The pre-Civil War farmers' societies had for the most part been independent local organizations of gentlemen farmers, and the results of their deliberations and experiments had reached only a limited number of the whole rural community. In contrast the new organizations were more democratic, and at the same time state-wide and nation-wide in scope. Whereas the older societies had been concerned largely (although not exclusively) with the techniques of crop and live stock production, the newer organizations, although interested in these things, also attempted to solve the economic ills of the farmer by cooperative business ventures and by political action. These business and political enterprises were for

the most part short-lived. In the southeastern states the farmers' cooperative stores, fertilizer plants, and tobacco and cotton producer associations were able to remain in operation for only short periods. Governmental action to secure an equitable income for the farmer through price support and subsidy was postponed until the days of the New Deal. Among the organizations which attempted unsuccessfully to cope with the economic problems of the farmer were the Grange, the Farmer's Alliance, the Farmer's Union, and the Tobacco Grower's Cooperative Association.

On the other hand, the movement to develop better farming methods and to educate farmers in these methods was more successful. The farmers' organizations held periodic meetings, demonstrations, and fairs, at which farming techniques were among the principal topics discussed, and these meetings reached a larger number of farmers than the meetings of the older clubs had ever reached. At length the function of experiment, demonstration, and education in farming techniques tended to be performed more and more by the agricultural colleges, experiment stations, and extension services in cooperation with the Federal Department of Agriculture, a development which the farm organizations themselves did much to foster.

A complete story of the "agrarian crusade" is beyond the scope of the present study. It is sufficient here to point out its contributions to conservation and better land use. The Patrons of Husbandry (the Grange), founded in 1867, expanded rapidly in the middle 1870's, but dwindled as rapidly after about 1877. The Farmer's Alliance appears to have received even greater support

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in Virginia and North Carolina than the Grange. It flourished during the period of hard times for tobacco and cotton farmers in the late 1880's and early 1890's. By this period the optimism engendered by the earlier expansion of bright tobacco had worn thin, and the producers were learning anew the disadvantages of one-crop, commercial agriculture. Entering Virginia for the first time in 1887, by 1891 the Alliance is said to have had 35,000 members in the state.⁵⁶ In North Carolina the growth of the Alliance was about the same. Local Alliances or clubs similar to them and cooperating with them were formed throughout both states. These groups voiced the farmers' discontent with prevailing low prices for farm products in comparison with the high prices for fertilizer and other necessities purchased by the farmer. These organizations preached the virtues of diversified agriculture as opposed to concentration on tobacco.⁵⁷ L. L. Polk, who had served as the first State Commissioner of Agriculture of North Carolina, became one of the principal Alliance leaders. The Progressive Farmer, which he founded in Winston, North Carolina in 1886, became one of the principal mouthpieces of the Alliance. Its columns were replete with advice against giving mortgages in order to raise tobacco, and in favor of the production of "hog and hominy" rather than low-priced tobacco with high-

56. Arnold, op. cit., pp. 46-49.

57. D. M. Payne, "The Farmers' Circle," Prog. Farmer, v. 1 (May 12, 1886), p. 1; P. E. Zink, "Resolutions of the Woodlawn Alliance," Prog. Farmer, v. 4 (Feb. 19, 1889), p. 1.

priced fertilizer, and it carried many practical articles on crop and livestock management. Other less influential Alliance publications also flourished for a time.

The evangelistic fervor of the Alliance movement died away after the early 1890's without leaving any apparent lasting results either in the form of better economic conditions or the introduction of better farming practices. The indirect results, however, were more lasting. More farmers formed the habit of meeting together to discuss mutual problems. The Alliance, like the Grange before it, cooperated with the state departments of agriculture and experiment stations in the formative years of those institutions, and leaders in the Grange and the Alliance were also active in the state governmental agencies.⁵⁸ This bore fruit when, contemporaneously with the heyday of the Alliance, the state agencies started their sponsorship of farmers' institutes. The Progressive Farmer survived the decline of the Alliance to become one of the most influential farm journals of the South.

An office of Commissioner of Agriculture was established in both Virginia and North Carolina in 1877. In each instance the research functions of the department were visualized as

58. See for instance H. B. Battle, Director of N. C. Agricultural Experiment Station, "Farmers, Attention. A Plan of Cooperation for Improvement in Farming Methods, etc.," a circular addressed to local Alliances, J. R. Osborne, MSS, Duke University.

important.⁵⁹ Particular stress was placed upon the analysis of fertilizers. In North Carolina the Board of Agriculture, under which the Commissioner functioned, also was in charge of an experiment station, the second state experiment station in the country to be established. The station was located at the Agricultural College, which at that time was part of the University of North Carolina, Chapel Hill. The University was the recipient of federal aid under the Morrill Land Grant Act of 1862. The station was to test fertilizers, seeds, and marls, to conduct field experiments, and to perform related experimental tasks for the farmers. In 1886 an experimental farm was started at Raleigh under the direction of Milton Whitney, later head of the Bureau of Soils in the federal Department of Agriculture. Among other activities, studies were begun of the effects of green manuring and mulching on the soil in comparison with artificial fertilizers, and of methods to restore fertility to depleted soil. Three years later the Station was transferred to the newly formed College of Agriculture and Mechanic Arts, under the provisions of the federal Hatch Act setting up agricultural experiment stations in each state.⁶⁰ As indicated in a later section of this

59.[Virginia], First Annual Report of the Commissioner of Agriculture of the State of Virginia (Richmond, 1877), p. 1; N. C. Comm. Agri., Report, 1877-1878.

60.Alfred Charles True, A History of Agricultural Experimentation and Research in the United States, 1607-1925, U.S.D.A. Misc. Publ. No. 251 (Washington, 1937), p. 89; N. C. Agricultural Experiment Station, Annual Report ... No. 22 (Raleigh, 1899), pp. IX-XIX; [North Carolina] Bulletin, North Carolina Department of Agriculture (April, 1887), p. 5.

study, the North Carolina Experiment Station was a pioneer in the investigation of terracing methods.

In order to place the growing body of knowledge developed by the experiment stations and agricultural colleges before the public, farmers' institutes were organized. In North Carolina these were conducted by the Board of Agriculture and in Virginia by the land grant college. These were local gatherings of farmers, usually held for about two days in late summer, at which representatives of the state agricultural agencies and other farm leaders spoke. The topics discussed at one such institute in 1887 were:

- Farming as a business.
- How to prevent land from washing.
- Fertilizers, manures and composting.
- Corn culture.
- Cotton culture.
- Tobacco from the seed bed to the barn.
- The small grains.
- The garden.
- The use and abuse of the cow.
- Silos and ensilage.
- Grasses and clover.
- Chemistry of the farm.
- Farm organizations and the Agricultural Department.⁶¹

The institutes were among the principal methods of demonstration and education for the governmental agencies before the advent of the county agents and of agricultural education in the public schools. Demonstration work conducted directly on the farm by agents and by farmers who volunteered to use part of

⁶¹Anon., "Farmer's Institute," Prog. Farmer, v. 1 (July 21, 1887), p. 2.

their land for the production of crops according to an agreed plan was started in Texas in 1903 by Seaman A. Knapp as a means of combating the boll weevil, and it soon received support from the federal Department of Agriculture. By 1908 the work was being supported in other parts of the South by the General Education Board and local business men and farmers, and in that year there were 17 demonstration agents appointed in Virginia and 13 in North Carolina. The Smith-Lever Act of 1914 set up the system of federally sponsored county demonstration agents.⁶²

The problem of conservation of the soil in the southeastern states was at first approached only indirectly by the educational and experimental agencies discussed above. Soil conservation was inculcated as part of the general plan of more efficient and better balanced agricultural production. In the last decade of the nineteenth century other agencies and individuals began to emphasize, once again, the conservation problem as such. This growing movement was national in scope and was headed by foresters, geologists, and soil scientists connected with the federal Department of Agriculture, the United States Geological Survey, and state agencies. They in turn aroused the interest of the agricultural colleges, extension services, and farm magazines in the conservation of forests and soils, and started the modern

⁶²Alfred Charles True, A History of Agricultural Extension Work in the United States, 1785-1923, U.S.D.A. Misc. Publ. No. 15 (Washington, 1928), pp. 14-41, 60-64; See also A. C. True, A History of Agricultural Education in the United States, 1785-1925, U.S.D.A. Misc. Publ. No. 36 (Washington, 1929).

movement for soil conservation.

About 1892 George W. Vanderbilt purchased the tract of timber land in the western North Carolina mountains which became the Pisgah Forest, and employed Gifford Pinchot to institute a system of scientific forest management on the estate. In later years Pinchot became head of the Division of Forestry, Department of Agriculture, and a national leader of the conservation movement. In 1895, at the Cotton States and International Exhibition at Atlanta, the Forest Service, then headed by B. E. Fernow, had an exhibit including three relief models of a farm, the first illustrating soil destruction by deforestation and bad tillage, the second, reclamation by means of check dams, tree plantings and terracing, and the third, the farm as restored. The models strongly suggested conditions existing in the Piedmont and mountain regions.⁶³ In 1900 the Division of Soils of the Department of Agriculture started its survey and mapping program, and the reports of its field operations regularly called attention to the extent of erosion that had taken place in the different areas covered. Additional data on the results of deforestation on stream flow and soil wastage in the Piedmont was secured by the investigation of L. C. Glenn of the Geological Survey in 1904-1907. His report was one of the earliest detailed studies of soil

⁶³ Agriculture Yearbook, 1895, pp. 334-336, 520; Collier Cobb, "The Forests of North Carolina," North Carolina Booklet, v. 12 (Raleigh, 1912), pp. 136-157.

erosion processes in the southeast.⁶⁴ The movement for a national conservation policy was brought to a head by the calling of the Conference of Governors in Washington in 1908 by President Theodore Roosevelt, and the formation of a National Conservation Commission. In this conference and in the subsequent report of the Commission much stress was placed upon soil conservation, and the proceedings of the conference received publicity in the southeastern farm periodicals.⁶⁵

State geological and forestry agencies were also alive to the soil conservation problem. In 1908 the North Carolina Geological Survey secured W. W. Ashe of the United States Forest Service as state forester to administer the timber lands of the State Board of Education, to give lectures, and to advise individuals on the reclamation of abandoned land and other problems of reforestation.⁶⁶ The state farm agencies and the agricultural press took up the agitation, and once again, as in the 1830's, correspondents of the magazines portrayed in eloquent language the devastation wrought by erosion. One such writer declared:

64.L. C. Glenn, Denudation and Erosion in the Southern Appalachian Region and the Monongahela Basin, U.S.G.S. Professional Paper No. 72 (Washington, 1911).

65.James J. Hill, "President Hill on Soil Waste," Sou. Planter, 3rd ser., v. 69 (Oct. 1908), pp. 949-950; H. W. Wiley, The Conservation of the Fertility of the Soil, in National Cons. Comm. Report, 60th Cong., 2nd sess., S. Doc. 676 (Washington, 1909).

66.N. C. Geological Survey Papers, MSS, University of North Carolina Library, Chapel Hill, N. C.; W. W. Ashe, "Farming Lands Damaged More than a Million Dollars," Sou. Planter, 3rd ser., v. 69 (Oct. 1908), p. 902.

Travel about where you will, and poverty! poverty!! poverty!!! is in view. Gullies go on to larger gullies, hill tops wear down at an alarming rate, beds of streams rise, banks of sand deposit prevent natural drainage and former valuable tracts become filled with water, become sour and unproductive ... There is a great deal of talk just now about the "coming South" [and] its agricultural possibilities, but soil fertility and its maintenance [sic] is the "thorn in the flesh" against the advantages of longer seasons, until we come not only to know how to bring those things about but exhibit a fixed determination to follow up our knowledge with performance.⁶⁷

The experiment stations began to devote more attention to soil conservation as such in the early part of the century. In addition to investigating the effects of different crops on the soil, they prepared instructions on construction of terraces and the reclamation of gullies and galls. (See Chapter VII.) Later they conducted more elaborate terracing investigations and by the late 1920's were carrying out preliminary surveys of the extent of erosion damage.⁶⁸ In the meantime the agricultural press continued to harp on diversification and well balanced farming. When fertilizer prices were considered too high the farmer was urged, as a substitute, to raise more leguminous crops and to make compost.⁶⁹ Low prices for tobacco or cotton were sure to

67. Thomas L. Brown, "Preventing of Soil Waste," Prog. Farmer, v. 14 (Mar. 28, 1899), p. [1]; For an example of official state publicity on soil erosion and conservation, see C. L. Newman, "Soil Improvement," W. C. Dept. Agri., Bulletin, v. 30 (Oct. 1909), pp. 79-82.

68. Virginia Commission on Conditions of Farmers, Report of the Commission to Study the Condition of the Farmers of Virginia to the General Assembly of Virginia (Richmond, 1930), pp. 77-78.

69. C. M. Conner, "High Price of Fertilizers," Prog. Farmer, v. 21 (Feb. 7, 1907), p. 7.

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The experiment stations began to devote more attention to soil conservation as early as the early part of the century. In addition to investigating the effects of different crops on the soil, they proposed treatments on conservation of terraces and the protection of ridges and gullies. (See page VII.) Later they conducted more elaborate terracing investigations and by the late 1920's were carrying out preliminary surveys of the soil of erosion areas. In the meantime the agricultural research stations in Italy on diversification and well balanced farming. When terracing studies were conducted the high soil levels was noted, as a substitute, to raise more leguminous crops and to

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stimulate campaigns by producers' associations to curtail acreage. These were accompanied by the preaching of diversification under such slogans as "hog and hominy" or "food, feed and fertility".⁷⁰ Such campaigns had little effect on the working farmer.

The farmers of the bright tobacco belt do not seem to have been as "erosion conscious" before the early twentieth century as their contemporaries in the Piedmont cotton belt. There is probably no easy explanation for this fact, but several factors may be pointed out. The existence of sterile sandy soils, either in a virgin state or as old fields supporting stands of second growth pine, was looked upon as an asset, and the fact that former generations had "exhausted" and abandoned a goodly proportion of the area was considered not as a misfortune but as a cause for self-congratulation.⁷¹ The bright tobacco farmer relied upon commercial fertilizers to remedy whatever damage had been done in the past. The fact that a highly profitable crop could be raised on these poor soils tended to silence any arguments that commercial tobacco culture was wearing on the soil, especially since no other type of agriculture had proved equally profitable in the bright tobacco belt.

The antebellum reform movement had had a direct influence on comparatively few farmers at best. There was, therefore, no

70. See Prog. Farmer, v. 36 (1921), passim.

71. Cameron, op. cit., p. 44.

strong tradition of conservative land use. The requirements of the crop also discouraged crop rotations or the proper attention to subsistence crops and livestock. Even mechanical erosion control measures such as terracing, which might have been suitable on tobacco land, were for the most part neglected. Perhaps the cotton farmer felt a greater need for such measures than did the tobacco farmer because a larger acreage was required to produce cotton than tobacco. Although the area devoted to tobacco expanded gradually after 1879, the area in some other important crops declined, and the acreage of all improved land remained lower after the Civil War than it had been in 1860. (See Appendix No. II, Tables 1 and 4.) More improved farm land was reported in 1860 in 17 out of the 43 counties of the Tobacco and Mixed Farming Area than in any succeeding decennial census year. In 10 other counties the greatest area of improved land was reported in the period 1870-1910. (See Appendix No. III, Map No. 8.) The decrease in the area of improved land thus probably made the soil erosion problem seem less urgent.

In the latter 1880's and the 1890's overproduction and other causes led to declines in the price of tobacco and to a general depression. When cultivation of the weed ceased to be profitable the farmers discovered, or thought they discovered, that it was a source of a number of evils. It was claimed that cutting timber for curing the tobacco or in clearing tobacco fields had caused the climate to become drier.⁷² Tobacco cultivation on the same

⁷².Anon., "What the Culture of Tobacco Has Done," by Tar Heel, Prog. Farmer, v. 1 (Dec. 22, 1886), p. 4.

The first of these is the fact that the land was not improved at the time of the survey. The second is the fact that the land was not improved at the time of the survey. The third is the fact that the land was not improved at the time of the survey.

in the latter 1880's and the 1890's overpopulation and other factors led to a decline in the number of slaves and in a consequent reduction in the cultivation of the weed ceased to be profitable. When cultivation of the weed ceased to be profitable the farmers abandoned the growing of the weed. It was found that the weed was not a source of a number of evils. It was found that the weed was not a source of a number of evils. It was found that the weed was not a source of a number of evils.

land year after year had caused exhaustion of the chemical elements in the soil and this, in turn, had resulted in deterioration of the tobacco quality, it was said.⁷³ Single crop commercial agriculture was blamed for the kindred evils, high-priced fertilizers and mortgages.⁷⁴ These economic ills were the ones complained of most bitterly by the agricultural press and farm organizations.⁷⁵ The greatest effort of the Alliance was devoted to securing lower prices and better quality for goods the farmer bought and higher prices for the things he sold. Soil exhaustion and erosion, on the other hand, were evils that the farmer had with him always. Protective measures might be discussed in Alliance or institute meetings, as part of the program to make the farmer technically proficient in his calling, but there was no greater emphasis on this than on other technical subjects.

Toward the end of the century the literature on conservation of natural resources increased. As we have seen, this was largely through the work of Federal and state agencies and a few private individuals. It was only after the conservation campaign was being conducted on a national basis in the early decades of the present century that greater attention was paid to it in the

73. Anon., "A Word to the Farmers," Prog. Farmer, v. 4 (March 5, 1889), p. 4.

74. Anon., "The Mortgage System. Beware of Giving the First Mortgage," Prog. Farmer, v. 1 (February 17, 1886), p. 3; Anon., "Sensible Talk," Prog. Farmer, v. 1 (May 5, 1886), p. 4.

75. Tilley, Bright Tobacco Industry, pp. 161-164.

tobacco districts. The mass of the farmers of the Tobacco and Mixed Farming Area seem to have become aware of soil waste as a major problem only after attention had been focused on it nationally.

1. The first of these is the fact that the Commission has not yet received any information from the Government of the United States regarding the activities of the Committee for the Liberation of the People of the East (CLPE) in the United States. The Commission is therefore unable to determine whether the CLPE is a legitimate organization or a subversive one.

Chapter V

THE COTTON AREA, 1800-1860

Summary

After the invention of the cotton gin, cotton quickly displaced tobacco as the principal staple crop of the Piedmont southward from central North Carolina, and until the demand for tobacco revived after the second decade of the nineteenth century it was also raised in considerable quantities in northern North Carolina and Virginia. For a time the uplands of South Carolina and eastern Georgia were the leading centers of cotton production in the United States, but as fresh lands were opened to settlement in western Georgia and the Gulf states, the center of cotton production moved westward. South Carolina and Georgia suffered a relative decline in production compared to the newer states, but not an absolute decline. The crop of the Cotton Area of the Southern Piedmont increased from 170 million pounds in 1839 to 200 million pounds in 1859. Much of this increase was made

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a relative decline in production compared to the other states.
The end of the Civil War in 1865
Southern Virginia increased from 175 million pounds in 1870 to
the million pounds in 1880. Most of this increase was in

possible by the opening of the Creek and Cherokee lands under the Georgia land lotteries.

Cotton was at first the crop of the small farmer, but it was so profitable that many small farmers could purchase slaves and more land and become planters. Men with slaves also moved in from the coast to become upland cotton planters. The average size of landholdings and the number of slaves increased in the southern counties and districts of the Piedmont, the area called in this study the Cotton Plantation Area. At the same time a large proportion of the former white residents moved west. To the north and west of this, in the area herein designated as the Cotton Farming Area, whites continued to outnumber slaves, and landholdings remained relatively small. In the 1850's, as railroads penetrated the Cotton Farming Area and as commercial fertilizers became available, the production of cotton increased greatly.

Cotton required many plowings and hoeings to preserve moisture and keep the crop free from weeds, but many farmers failed to break the land deep enough before planting, thus exposing the crop to drought damage. Rows were often laid out at an angle to take advantage of the sunlight. Later, contoured rows and hillside ditching were used to preserve the land from washing. The invention of the "sweep" for cultivating, closer planting, and other improvements in management expanded the area cultivated per laborer, but too often there was no corresponding increase in conservation practices. The greater efficiency merely increased the capacity to exploit land. Rotations of cotton, corn, and

available by the opening of the Great West Indian Canal in 1848.

There was an early and rapid increase in the number of slaves.

As the number of slaves increased, the number of plantations also increased.

From the year 1800 to 1850, the number of slaves increased in the

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small grain were in use by the 1840's after depletion of fertility had become widespread and the competition of fresh western land was beginning to be felt. Composts were used to a limited extent. After about 1855 guano and mixed commercial fertilizers became popular. Gray sandy uplands were recognized as the best soils for cotton. River bottoms, black jack lands, slate lands, and clay loam uplands were regarded as less desirable for cotton in varying degrees because of excessive moisture. However, since antebellum husbandry included the production of a comparatively large amount of grain crops, these latter types of land, which were in many cases well suited to grain raising, were more in use before 1860 than in modern times.

When cotton became the important staple, the export of corn, wheat, and other supplies to the coastal areas ceased, and only enough supply crops were raised for home consumption. From about 1815 to about 1840 the concentration on cotton was so great that the region was forced to import corn, hogs, horses, mules, and other supplies from west of the mountains. During the depression of the 1840's there was a return to greater self-sufficiency, but dependence on outside sources for supplies never entirely ceased. The average farmer planted more cotton when there were prospects for good prices, and less when the price was low. He raised as much of his supplies as possible without interfering with the cotton crop. Instances of complete dependence on purchased supplies were rare.

Improvements in the cultivation of grain crops included the use of heavier plows and deeper plowing, and the application of

cotton seed and compost for fertilization. In rare instances cowpeas were plowed under for a manuring crop. The open range for cattle and the general neglect of livestock industries prevented much barnyard manure being saved for the crops.

Fresh land in the southwest acted as a constant magnet for the population of the older states, and was an underlying cause for wasteful habits of cultivation. Other factors contributing to the tendency to migrate from the Piedmont were the wearing out of the land, itself a result of wasteful methods, the inherent infertility of some Piedmont areas, increase in size of the planter's family, epidemics, and drought.

The normal cycle of land use in this region consisted of clearing, cultivation for a number of years, soil erosion and depletion of natural fertility, abandonment, the growth of broom sedge and pine trees, and perhaps, after a long time, reclearing and the beginning of a new cycle. Since individual farms and fields were settled and cleared at different times, lands in all different stages of the cycle could be found in any one locality. Larger areas, however, went through somewhat the same cycle. Groups of counties in the Plantation Area settled at about the same period first experienced rapid growth and an increase in farming activities. Then came out-migration, accompanied by increase in the size of land holdings and proportion of slave population. In the latter stages there were complaints of worn out lands and hard times. In the Plantation Area of Georgia the transition from settlement to immigration was more rapid than in South Carolina, partly because Georgia was nearer to the new

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Gulf-state lands. Immigration from the Cotton Farming Area was not as great in proportion, and growth continued on the whole throughout the pre-Civil War period.

A reform movement arose as a result of immigration, western competition, and depression. Attempts were made to secure greater self-sufficiency, improved cropping practices, and to discover alternative enterprises, both agricultural and industrial, to supplement the one-crop economy. Local societies were founded to propagate these ideas and an agricultural press came into existence. State aid was enlisted for agricultural surveys and agricultural education. The movement was partially successful. The decade 1840-1850 was one of greater self-sufficiency than before, but there was an increase in cotton cultivation in the 1850's. Contour cultivation, hillside ditching, and better cropping practices were rather widespread. The great mass of the farmers, however, was little influenced by the reform movement. Some reformers hoped to establish the textile industry to furnish employment for the excess farm population for whom cotton raising no longer furnished a good living, but these plans did not materialize, in the main, until several decades after the Civil War.

Emergence of the Cotton Area

The search for a profitable staple crop for the Georgia, South Carolina, and southern North Carolina sections of the Piedmont was brought to an end by the invention of the cotton gin. The dark "nankeen" cotton, raised in the back country for home

Self-sufficiency. Investigation shows the South is not self-sufficient in food, and even in transportation, and growth continues on the whole throughout the post-war period.

A serious economic crisis as a result of inflation, however,

inflation, and depression. Inflation was not so serious during the post-war period, however, and the economy

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the post-war period, several decades after the Civil War.

Development of the Southern Area

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South Carolina, and southern North Carolina counties of the South.

The South "developed" rapidly, raised in the South economy, the South.

use, was now replaced by the green seed variety raised for export. The first water-powered cotton gin in the Piedmont was erected in Fairfield District, South Carolina in 1795 and production spread rapidly after that date. The cultivation of tobacco had been increasing since the end of the Revolution, and in 1799 the amount exported from South Carolina was 9,646 hogsheads, but exports declined after that date as farmers turned to cotton raising. Tobacco culture nevertheless lingered in the western part of the region for some time.¹ When cotton was first introduced on a commercial basis it was regarded as the crop par excellence of the small inland farmer. The depressed state of the tobacco market at the close of the century had made that product scarcely worth the long haul to the coast. By raising cotton many of the small farmer class was able "to pass from a state of depression to easy and comfortable circumstances."² We are informed that the supposed exhausting effect of tobacco on the soil also induced farmers to turn to the cultivation of grains and cotton.³

The production of ginned cotton in Virginia, the Carolinas, and Georgia in the early nineteenth century was approximately as follows: 39 million pounds in 1801, 75 million in 1811, 188

1. Drayton, op. cit., pp. 114, 128-129, 173; U. S. Census Office, Report on Cotton Production in the United States (Washington, 1884) (Tenth Census of the United States, 1880, v. 6), part 2, p. 470. Cited hereafter as Cotton Report, 1880.

2. Ramsay, Hist. of South Carolina, v. 2, p. 305.

3. La Rochefoucault Liancourt, Travels, v. 2, p. 496.

[illegible]

DOI: 10.1002/for

Reported in *Journal of the American Medical Association*, 1954, 157: 1000-1001.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, 1997, 76, 10, 13.

and that the Government of the United States is not bound to pay for the same.

The report stated that the two men were seen leaving the building at approximately 10:30 p.m.

1947. A. S. D. 1947.

U.S. DEPARTMENT OF THE ARMY

million in 1826 and 160 million in 1834. Production began to decline in Virginia and North Carolina after 1826, coincident with the beginning of revival of tobacco in those states. At about the same time the great expansion of cotton raising to the fresh lands of western Georgia and the old southwest was beginning. South Carolina, which held first rank among the cotton producing states in the early decades, yielded this distinction to Georgia by 1826, and Georgia in turn was surpassed by Alabama and Mississippi by 1834.⁴ South Carolina and Georgia, however, suffered only a relative, not an absolute decline in production. In that part of the North Carolina, South Carolina, and Georgia Piedmont in which cotton eventually became the principal staple crop there was a general upward trend in production throughout the period before the Civil War. The census records a crop of about 170 million pounds in 1839, about 190 million in 1849, and 200 million in 1859.

Much of the early increase in production in the Piedmont was made possible by the opening of the Indian lands in Georgia. The cotton crop of the state increased from 10 million pounds in 1801 to 75 million in 1834. Until 1803 the organized parts of Georgia had included only the area east of the Oconee River and south of a line extending from southwest to northeast through the modern counties of Hall, Banks, Habersham, and Stephens. The Piedmont

⁴.Levi Woodbury, Cotton: Cultivation, Manufacture and Foreign Trade, 24th Cong., 1st sess., H. of R. Doc. No. 146 (Washington, 1836). Figures are based on Woodbury's estimates of raw cotton produced.

valued in 1865 and 1870 million in 1874. Production began to
 decline in Virginia and North Carolina about 1860, and
 from the beginning of revival of tobacco in those states. At
 about the same time the great expansion of cotton relating to the
 West Indies of western Georgia and the old settlement was begin-
 ning. South Carolina, which had been the great
 producing state in the early decades, yielded this distinction
 to Georgia by 1865, and Georgia in turn was surpassed by Al-
 abama and Mississippi by 1870. The cotton industry
 suffered only a relative, and no absolute decline in production.
 In that year of the North Carolina cotton crop, the Georgia
 production is about 100,000 bales, and the Alabama crop
 was about 150,000 bales. The production of Georgia
 the period before the Civil War. The census records a crop of
 about 175 million pounds in 1859, about 150 million in 1860, and
 125 million in 1861.

One of the early increases in production in the Federal was
 due possibly by the opening of the Indian lands in Georgia. The
 cotton crop of the state increased from 15 million pounds in 1851
 to 75 million in 1855. Until 1861 the organized lands of Georgia
 did not extend only the area east of the Ogeechee River and north of
 a line extending from southwest to northeast through the western
 corner of 1861, 1862, 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 2682, 2683, 2684, 2685, 2686, 2687, 2688, 2689, 2690, 2691, 2692, 2693, 2694, 2695, 2696, 2697, 2698, 2699, 2700, 2701, 2702, 2703, 2704, 2705, 2706, 2707, 2708, 2709, 2710, 2711, 2712, 2713, 2714, 2715, 2716, 2717, 2718, 2719, 2720, 2721, 2722, 2723, 2724, 2725, 2726, 2727, 2728, 2729, 2730, 2731, 2732, 2733, 2734, 2735, 2736, 2737, 2738, 2739, 2740, 2741, 2742, 2743, 2744, 2745, 2746, 2747, 2748, 2749, 2750, 2751, 2752, 2753, 2754, 2755, 2756, 2757, 2758, 2759, 2760, 2761, 2762, 2763, 2764, 2765, 2766, 2767, 2768, 2769, 2770, 2771, 2772, 2773, 2774, 2775, 2776, 2777, 2778, 2779, 2780, 2781, 2782, 2783, 2784, 2785, 2786, 2787, 2788, 2789, 2790, 2791, 2792, 2793, 2794, 2795, 2796, 2797, 2798, 2799, 2800, 2801, 2802, 2803, 2804, 2805, 2806, 2807, 2808, 2809, 2810, 2811, 2812, 2813, 2814, 2815, 2816, 2817, 2818, 2819, 2820, 2821, 2822, 2823, 2824, 2825, 2826, 2827, 2828, 2829, 2830, 2831, 2832, 2833, 2834, 2835, 2836, 2837, 2838, 2839, 2840, 2841, 2842, 2843, 2844, 2845, 2846, 2847, 2848, 2849, 2850, 2851, 2852, 2853, 2854, 2855, 2856, 2857, 2858, 2859, 2860, 2861, 2862, 2863, 2864, 2865, 2866, 2867, 2868, 2869, 2870, 2871, 2872, 2873, 2874, 2875, 2876, 2877, 2878, 2879, 2880, 2881, 2882, 2883, 2884, 2885, 2886, 2887, 2888, 2889, 2890, 2891, 2892, 2893, 2894, 2895, 2896, 2897, 2898, 2899, 2900, 2901, 2902, 2903, 2904, 2905, 2906, 2907, 2908, 2909, 2910, 2911, 2912, 2913, 2914, 2915, 2916, 2917, 2918, 2919, 2920, 2921, 2922, 2923, 2924, 2925, 2926, 2927, 2928, 2929, 2930, 2931, 2932, 2933, 2934, 2935, 2936, 2937, 2938, 2939, 2940, 2941, 2942, 2943, 2944, 2945, 2946, 2947, 2948, 2949, 2950, 2951, 2952, 2953, 2954, 2955, 2956, 2957, 2958, 2959, 2960, 2961, 2962, 2963, 2964, 2965, 2966, 2967, 2968, 2969, 2970, 2971, 2972, 2973, 2974, 2975, 2976, 2977, 2978, 2979, 2980, 2981, 2982, 2983, 2984, 2985, 2986, 2987, 2988, 2989, 2990, 2991, 2992, 2993, 2994, 2995, 2996, 2997, 2998, 2999, 3000, 3001, 3002, 3003, 3004, 3005, 3006, 3007, 3008, 3009, 3010, 3011, 3012, 3013, 3014, 3015, 3016, 3017, 3018, 3019, 3020, 3021, 3022, 3023, 3024, 3025, 3026, 3027, 3028, 3029, 3030, 3031, 3032, 3033, 3034, 3035, 3036, 3037, 3038, 3039, 3040, 3041, 3042, 3043, 3044, 3045, 3046, 3047, 3048, 3049, 3050, 3051, 3052, 3053, 3054, 3055, 3056, 3057, 3058, 3059, 3060, 3061, 3062, 3063, 3064, 3065, 3066, 3067, 3068, 3069, 3070, 3071, 3072, 3073, 3074, 3075, 3076, 3077, 3078, 3079, 3080, 3081, 3082, 3083, 3084, 3085, 3086, 3087, 3088, 3089, 3090, 3091, 3092, 3093, 3094, 3095, 3096, 3097, 3098, 3099, 3100, 3101, 3102, 3103, 3104, 3105, 3106, 3107, 3108, 3109, 3110, 3111, 3112, 3113, 3114, 3115, 3116, 3117, 3118, 3119, 3120, 3121, 3122, 3123, 3124, 3125, 3126, 3127, 3128, 3129, 3130, 3131, 3132, 3133, 3134, 3135, 3136, 3137, 3138, 3139, 3140, 3141, 3142, 3143, 3144, 3145, 3146, 3147, 3148, 3149, 3150, 3151, 3152, 3153, 3154, 3155, 3156, 3157, 3158, 3159, 3160, 3161, 3162, 3163, 3164, 3165, 3166, 3167, 3168, 3169, 3170, 3171, 3172, 3173, 3174, 3175, 3176, 3177, 3178, 3179, 3180, 3181, 3182, 3183, 3184, 3185, 3186, 3187, 3188, 3189, 3190, 3191, 3192, 3193, 3194, 3195, 3196, 3197, 3198, 3199, 3200, 3201, 3202, 3203, 3204, 3205, 3206, 3207, 3208, 3209, 3210, 3211, 3212, 3213, 3214, 3215, 3216, 3217, 3218, 3219, 3220, 3221, 3222, 3223, 3224, 3225, 3226, 3227, 3228, 3229, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3268, 3269, 3270, 3271, 3272, 3273, 3274, 3275, 3276, 3277, 3278, 3279, 3280, 3281, 3282, 3283, 3284, 3285, 3286, 3287, 3288, 3289, 3290, 3291, 3292, 3293, 3294, 3295, 3296, 3297, 3298, 3299, 3300, 3301, 3302, 3303, 3304, 3305, 3306, 3307, 3308, 3309, 3310, 3311, 3312, 3313, 3314, 3315, 3316, 3317, 3318, 3319, 3320, 3321, 3322, 3323, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3332, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344, 3345, 3346, 3347, 3348, 3349, 3350, 3351, 3352, 3353, 3354, 3355, 3356, 3357, 3358, 3359, 3360, 3361, 3362, 3363, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3371, 3372, 3373, 3374, 3375, 3376, 3377, 3378, 3379, 3380, 3381, 3382, 3383, 3384, 3385, 3386, 3387, 3388, 3389, 3390, 3391, 3392, 3393, 3394, 3395, 3396, 3397, 3398, 3399, 3400, 3401, 3402, 3403, 3404, 3405, 3406, 3407, 3408, 3409, 3410, 3411, 3412, 3413, 3414, 3415, 3416, 3417, 3418, 3419, 3420, 3421, 3422, 3423, 3424, 3425, 3426, 3427, 3428, 3429, 3430, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3440, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 3448, 3449, 3450, 3451, 3452, 3453, 3454, 3455, 3456, 3457, 3458, 3459, 3460, 3461, 3462, 3463, 3464, 3465, 3466, 3467, 3468, 3469, 3470, 3471, 3472, 3473, 3474, 3475, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484, 3485, 3486, 3487, 3488, 3489, 3490, 3491, 3492, 3493, 3494, 3495, 3496, 3497, 3498, 3499, 3500, 3501, 3502, 3503, 3504, 3505, 3506, 3507, 3508, 3509, 3510, 3511, 3512, 3513, 3514, 3515, 3516, 3517, 3518, 3519, 3520, 3521, 3522, 3523, 3524, 3525, 3526, 3527, 3528, 3529, 3530, 3531, 3532, 3533, 3534, 3535, 3536, 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547, 3548, 3549, 3550, 3551, 3552, 3553, 3554, 3555, 3556, 3557, 3558, 3559, 3560, 3561, 3562, 3563, 3564, 3565, 3566, 3567, 3568, 3569, 3570, 3571, 3572, 3573, 3574, 3575, 3576, 3577, 3578, 3579, 3580, 3581, 3582, 3583, 3584, 3585, 3586, 3587, 3588, 3589, 3590, 3591, 3592, 3593, 3594, 3595, 3596, 3597, 3598, 3599, 3600, 3601, 3602, 3603, 3604, 3605, 3606, 3607, 3608, 3609, 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617, 3618, 3619, 3620, 3621, 3622, 3623, 3624, 3625, 3626, 3627, 3628, 3629, 3630, 3631, 3632, 3633, 3634, 3635, 3636, 3637, 3638, 3639, 3640, 3641, 3642, 3643, 3644, 3645, 3646, 3647, 3648, 3649, 3650, 3651, 3652, 3653, 3654, 3655, 3656, 3657, 3658, 3659, 3660, 3661, 3662, 3663, 3664, 3665, 3666, 3667, 3668, 3669, 3670, 3671, 3672, 3673, 3674, 3675, 3676, 3677, 3678, 3679, 3680, 3681, 3682, 3683, 3684, 3685, 3686, 3687, 3688, 3689, 3690, 3691, 3692, 3693, 3694, 3695, 3696, 3697, 3698, 3699, 3700, 3701, 3702, 3703, 3704, 3705, 3706, 3707, 3708, 3709, 3710, 3711, 3712, 3713, 3714, 3715, 3716, 3717, 3718, 3719, 3720, 3721, 3722, 3723, 3724, 3725, 3726, 3727, 3728, 3729, 3730, 3731, 3732, 3733, 3734, 3735, 3736, 3737, 3738, 3739, 3740, 3741, 3742, 3743, 3744, 3745, 3746, 3747, 3748, 3749, 3750, 3751, 3752, 3753, 3754, 3755, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3764, 3765, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3779, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 3787, 3788, 3789, 3790, 3791, 3792, 3793, 3794, 3795, 3796, 3797, 3798, 3799, 3800, 3801, 3802, 3803, 3804, 3805, 3806, 3807, 3808, 3809, 3810, 3811, 3812, 3813, 3814, 3815, 3816, 3817, 3818, 3819, 3820, 3821, 3822, 3823, 3824, 3825, 3826, 3827, 3828, 3829, 3830, 3831, 3832, 3833, 3834, 3835, 3836, 3837, 3838, 38

sections west and north of these lines were disposed of to settlers by a series of six lotteries. As the public domain of the state was taken from the Indians it was laid out in numbered lots of uniform size. The numbers were drawn in a lottery in which every adult male citizen of the state or head of a family was eligible to participate. Lotteries in 1803 and 1806 disposed of portions of the territory between the Oconee and the Ocmulgee; the lottery of 1820 was held for a narrow strip roughly embracing modern Walton, Gwinnett, Hall, and Habersham counties; that of 1820 was held for land between the Ocmulgee and the Flint; that of 1826 disposed of the area between the Flint and the western boundary of the State; and finally in 1832 a lottery opened the Cherokee lands northwest of the upper Chattahoochee. Lots in most of these districts contained 202 1/2 acres, but those in the lottery of 1820 contained 250 acres, and those in the Cherokee lottery, 160 acres.⁵

In the Piedmont areas nearest coastal markets, and where cotton had been cultivated on a commercial basis for the longest period of time, the crop did not long remain the exclusive perquisite of the small farmer. Small inland farmers began to purchase slaves in order to expand cotton cultivation, and in addition wealthy planters from the coast moved up-country with their

5.G. G. McLendon, History of the Public Domain of Georgia (Atlanta, 1924), pp. 119, 121-128; "Hall's Original County Map of Georgia Showing Present and Original Counties and Land Districts," scale 10 mi. = 1 in. (Atlanta, 1895), MS, Office of Secretary of State, Atlanta.

slaves to engage in the profitable new business.⁶ As the planters prospered they enlarged their holdings of slaves and lands. The process of consolidation and enlargement of operating units was aided by the out-migration of an increasing number of whites. It culminated in the creation of a black plantation belt, distinguished from the remainder of the cotton Piedmont by its negro majorities and the large size of its farms. In the South Carolina portion of this plantation belt the negro population first surpassed the white in numbers in the period 1830-1860. In Georgia the process was more rapid. In the older counties in the southeastern part of the Georgia Piedmont plantation belt, negro majorities were recorded in 1820, and in the newer counties to the west, in the period 1830-1850. The way in which increase in slave population was accompanied by consolidation of landholdings is indicated in Tables No. 3 and 4.⁷ The Cotton Plantation Area, as defined in this study and shown on Map No. 1, includes the counties in which 50 percent or more of the farms contained more than 100 acres in 1860, or in which negro population constituted over 50 percent of the total in that year.⁸ This area generally produced larger crops of cotton than the Cotton Farming Area.

6. James H. Carlisle, "History of Fairfield," The State (Columbia, S. C.), Jan. 24, 1907, p. 12.

7. See also U. B. Phillips, "Origin and Growth of Southern Black Belts," American Historical Review, v. 11 (July 1906), pp. 798-816.

8. A few outlying counties are omitted from the area.

Table No. 3

Greene Co., Ga. (organized, 1786):
Population of Entire County
and Land Holdings in District 145

| | <u>1790</u> | <u>1800</u> | <u>1810</u> | <u>1820</u> | <u>1830</u> | <u>1840</u> | <u>1850</u> | <u>1860</u> |
|--|-------------|--------------|-------------|---------------|-------------|-------------|-------------|--------------|
| Entire
County,
Population ¹ : | | | | | | | | |
| White | 4,020 | <u>7,097</u> | 6,398 | 6,599 | 5,029 | 4,641 | 4,744 | 4,229 |
| Negro | 1,385 | 3,664 | 5,281 | 6,990 | 7,520 | 6,049 | 8,324 | <u>8,423</u> |
| Total | 5,405 | 10,761 | 11,679 | <u>13,589</u> | 12,549 | 11,690 | 13,068 | 12,652 |
| | | | <u>1797</u> | | <u>1815</u> | | | <u>1859</u> |
| Landholdings,
Dist. 145 ² : | | | | | | | | |
| No. of land
owners | | | 38 | | 35 | | | 24 |
| Acres owned | | | 6,443 | | 11,146 | | | 12,068 |
| Average hold-
ing--acres | | | 169 | | 318 | | | 503 |

1. Source: U. S. Census.

2. Source: Tax Digests, Greene Co., 1797, 1815, 1859, MSS, Duke University Library. In 1797 District 145 was about twice as large as in 1815 and 1859.

THE UNIVERSITY OF CHICAGO
 DEPARTMENT OF CHEMISTRY
 5710 SOUTH CAMPUS DRIVE

DATE: 1961 JAN 10 TIME: 10:00 AM

RECEIVED
 JAN 10 1961

TO: DR. J. H. DUNN
 FROM: DR. J. H. DUNN
 SUBJECT: 1,2-DICHLOROETHANE
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RECEIVED
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Table No. 4

Harris Co., Ga. (opened to settlement, 1827):
 Population of Entire County
 and Land and Slave Holdings,
 Districts Nos. 20 and 21

| | <u>1830</u> | <u>1840</u> | <u>1850</u> | <u>1860</u> |
|---|------------------------|--------------|---------------|-------------|
| Entire
County
Population ¹ : | | | | |
| White | 2,831 | <u>7,482</u> | 6,709 | 5,979 |
| Colored | 2,274 | 6,451 | <u>8,012</u> | 7,757 |
| Total | 5,105 | 13,933 | <u>14,721</u> | 13,736 |
| | | | <u>1831</u> | <u>1845</u> |
| Districts
20 and 21 | | | | |
| Land holdings ² | [No. of land owners | 204 | 323 | |
| | [Acres owned | 54,124 | 151,771 | |
| | [Average holding--a. | 265 | 476 | |
| Slave holdings ² | [No. of slave owners | 118 | 216 | |
| | [No. of slaves owned | 1,153 | 2,828 | |
| | [Average holding--no. | 9.7 | 13 | |

1. Source: U. S. Census.

2. Source: Tax Digests, Harris Co., 1831 and 1845, MSS, Georgia Department of Archives and History, Atlanta.

Table 1

Table 1 shows the results of the analysis of variance for the different treatments. The values in parentheses are the standard errors of the means.

| Treatment | Mean | Standard Error | Sum of Squares | D.F. |
|--------------|-------|----------------|----------------|------|
| Control | 10.5 | 0.5 | 10.5 | 1 |
| Treatment A | 11.2 | 0.4 | 11.2 | 1 |
| Treatment B | 11.8 | 0.3 | 11.8 | 1 |
| Treatment C | 12.5 | 0.2 | 12.5 | 1 |
| Treatment D | 13.2 | 0.1 | 13.2 | 1 |
| Treatment E | 14.0 | 0.1 | 14.0 | 1 |
| Treatment F | 14.8 | 0.1 | 14.8 | 1 |
| Treatment G | 15.5 | 0.1 | 15.5 | 1 |
| Treatment H | 16.2 | 0.1 | 16.2 | 1 |
| Treatment I | 17.0 | 0.1 | 17.0 | 1 |
| Treatment J | 17.8 | 0.1 | 17.8 | 1 |
| Treatment K | 18.5 | 0.1 | 18.5 | 1 |
| Treatment L | 19.2 | 0.1 | 19.2 | 1 |
| Treatment M | 20.0 | 0.1 | 20.0 | 1 |
| Treatment N | 20.8 | 0.1 | 20.8 | 1 |
| Treatment O | 21.5 | 0.1 | 21.5 | 1 |
| Treatment P | 22.2 | 0.1 | 22.2 | 1 |
| Treatment Q | 23.0 | 0.1 | 23.0 | 1 |
| Treatment R | 23.8 | 0.1 | 23.8 | 1 |
| Treatment S | 24.5 | 0.1 | 24.5 | 1 |
| Treatment T | 25.2 | 0.1 | 25.2 | 1 |
| Treatment U | 26.0 | 0.1 | 26.0 | 1 |
| Treatment V | 26.8 | 0.1 | 26.8 | 1 |
| Treatment W | 27.5 | 0.1 | 27.5 | 1 |
| Treatment X | 28.2 | 0.1 | 28.2 | 1 |
| Treatment Y | 29.0 | 0.1 | 29.0 | 1 |
| Treatment Z | 29.8 | 0.1 | 29.8 | 1 |
| Treatment AA | 30.5 | 0.1 | 30.5 | 1 |
| Treatment AB | 31.2 | 0.1 | 31.2 | 1 |
| Treatment AC | 32.0 | 0.1 | 32.0 | 1 |
| Treatment AD | 32.8 | 0.1 | 32.8 | 1 |
| Treatment AE | 33.5 | 0.1 | 33.5 | 1 |
| Treatment AF | 34.2 | 0.1 | 34.2 | 1 |
| Treatment AG | 35.0 | 0.1 | 35.0 | 1 |
| Treatment AH | 35.8 | 0.1 | 35.8 | 1 |
| Treatment AI | 36.5 | 0.1 | 36.5 | 1 |
| Treatment AJ | 37.2 | 0.1 | 37.2 | 1 |
| Treatment AK | 38.0 | 0.1 | 38.0 | 1 |
| Treatment AL | 38.8 | 0.1 | 38.8 | 1 |
| Treatment AM | 39.5 | 0.1 | 39.5 | 1 |
| Treatment AN | 40.2 | 0.1 | 40.2 | 1 |
| Treatment AO | 41.0 | 0.1 | 41.0 | 1 |
| Treatment AP | 41.8 | 0.1 | 41.8 | 1 |
| Treatment AQ | 42.5 | 0.1 | 42.5 | 1 |
| Treatment AR | 43.2 | 0.1 | 43.2 | 1 |
| Treatment AS | 44.0 | 0.1 | 44.0 | 1 |
| Treatment AT | 44.8 | 0.1 | 44.8 | 1 |
| Treatment AU | 45.5 | 0.1 | 45.5 | 1 |
| Treatment AV | 46.2 | 0.1 | 46.2 | 1 |
| Treatment AW | 47.0 | 0.1 | 47.0 | 1 |
| Treatment AX | 47.8 | 0.1 | 47.8 | 1 |
| Treatment AY | 48.5 | 0.1 | 48.5 | 1 |
| Treatment AZ | 49.2 | 0.1 | 49.2 | 1 |
| Treatment BA | 50.0 | 0.1 | 50.0 | 1 |
| Treatment BB | 50.8 | 0.1 | 50.8 | 1 |
| Treatment BC | 51.5 | 0.1 | 51.5 | 1 |
| Treatment BD | 52.2 | 0.1 | 52.2 | 1 |
| Treatment BE | 53.0 | 0.1 | 53.0 | 1 |
| Treatment BF | 53.8 | 0.1 | 53.8 | 1 |
| Treatment BG | 54.5 | 0.1 | 54.5 | 1 |
| Treatment BH | 55.2 | 0.1 | 55.2 | 1 |
| Treatment BI | 56.0 | 0.1 | 56.0 | 1 |
| Treatment BJ | 56.8 | 0.1 | 56.8 | 1 |
| Treatment BK | 57.5 | 0.1 | 57.5 | 1 |
| Treatment BL | 58.2 | 0.1 | 58.2 | 1 |
| Treatment BM | 59.0 | 0.1 | 59.0 | 1 |
| Treatment BN | 59.8 | 0.1 | 59.8 | 1 |
| Treatment BO | 60.5 | 0.1 | 60.5 | 1 |
| Treatment BP | 61.2 | 0.1 | 61.2 | 1 |
| Treatment BQ | 62.0 | 0.1 | 62.0 | 1 |
| Treatment BR | 62.8 | 0.1 | 62.8 | 1 |
| Treatment BS | 63.5 | 0.1 | 63.5 | 1 |
| Treatment BT | 64.2 | 0.1 | 64.2 | 1 |
| Treatment BU | 65.0 | 0.1 | 65.0 | 1 |
| Treatment BV | 65.8 | 0.1 | 65.8 | 1 |
| Treatment BW | 66.5 | 0.1 | 66.5 | 1 |
| Treatment BX | 67.2 | 0.1 | 67.2 | 1 |
| Treatment BY | 68.0 | 0.1 | 68.0 | 1 |
| Treatment BZ | 68.8 | 0.1 | 68.8 | 1 |
| Treatment CA | 69.5 | 0.1 | 69.5 | 1 |
| Treatment CB | 70.2 | 0.1 | 70.2 | 1 |
| Treatment CC | 71.0 | 0.1 | 71.0 | 1 |
| Treatment CD | 71.8 | 0.1 | 71.8 | 1 |
| Treatment CE | 72.5 | 0.1 | 72.5 | 1 |
| Treatment CF | 73.2 | 0.1 | 73.2 | 1 |
| Treatment CG | 74.0 | 0.1 | 74.0 | 1 |
| Treatment CH | 74.8 | 0.1 | 74.8 | 1 |
| Treatment CI | 75.5 | 0.1 | 75.5 | 1 |
| Treatment CJ | 76.2 | 0.1 | 76.2 | 1 |
| Treatment CK | 77.0 | 0.1 | 77.0 | 1 |
| Treatment CL | 77.8 | 0.1 | 77.8 | 1 |
| Treatment CM | 78.5 | 0.1 | 78.5 | 1 |
| Treatment CN | 79.2 | 0.1 | 79.2 | 1 |
| Treatment CO | 80.0 | 0.1 | 80.0 | 1 |
| Treatment CP | 80.8 | 0.1 | 80.8 | 1 |
| Treatment CQ | 81.5 | 0.1 | 81.5 | 1 |
| Treatment CR | 82.2 | 0.1 | 82.2 | 1 |
| Treatment CS | 83.0 | 0.1 | 83.0 | 1 |
| Treatment CT | 83.8 | 0.1 | 83.8 | 1 |
| Treatment CU | 84.5 | 0.1 | 84.5 | 1 |
| Treatment CV | 85.2 | 0.1 | 85.2 | 1 |
| Treatment CW | 86.0 | 0.1 | 86.0 | 1 |
| Treatment CX | 86.8 | 0.1 | 86.8 | 1 |
| Treatment CY | 87.5 | 0.1 | 87.5 | 1 |
| Treatment CZ | 88.2 | 0.1 | 88.2 | 1 |
| Treatment DA | 89.0 | 0.1 | 89.0 | 1 |
| Treatment DB | 89.8 | 0.1 | 89.8 | 1 |
| Treatment DC | 90.5 | 0.1 | 90.5 | 1 |
| Treatment DD | 91.2 | 0.1 | 91.2 | 1 |
| Treatment DE | 92.0 | 0.1 | 92.0 | 1 |
| Treatment DF | 92.8 | 0.1 | 92.8 | 1 |
| Treatment DG | 93.5 | 0.1 | 93.5 | 1 |
| Treatment DH | 94.2 | 0.1 | 94.2 | 1 |
| Treatment DI | 95.0 | 0.1 | 95.0 | 1 |
| Treatment DJ | 95.8 | 0.1 | 95.8 | 1 |
| Treatment DK | 96.5 | 0.1 | 96.5 | 1 |
| Treatment DL | 97.2 | 0.1 | 97.2 | 1 |
| Treatment DM | 98.0 | 0.1 | 98.0 | 1 |
| Treatment DN | 98.8 | 0.1 | 98.8 | 1 |
| Treatment DO | 99.5 | 0.1 | 99.5 | 1 |
| Treatment DP | 100.2 | 0.1 | 100.2 | 1 |
| Treatment DQ | 101.0 | 0.1 | 101.0 | 1 |
| Treatment DR | 101.8 | 0.1 | 101.8 | 1 |
| Treatment DS | 102.5 | 0.1 | 102.5 | 1 |
| Treatment DT | 103.2 | 0.1 | 103.2 | 1 |
| Treatment DU | 104.0 | 0.1 | 104.0 | 1 |
| Treatment DV | 104.8 | 0.1 | 104.8 | 1 |
| Treatment DW | 105.5 | 0.1 | 105.5 | 1 |
| Treatment DX | 106.2 | 0.1 | 106.2 | 1 |
| Treatment DY | 107.0 | 0.1 | 107.0 | 1 |
| Treatment DZ | 107.8 | 0.1 | 107.8 | 1 |
| Treatment EA | 108.5 | 0.1 | 108.5 | 1 |
| Treatment EB | 109.2 | 0.1 | 109.2 | 1 |
| Treatment EC | 110.0 | 0.1 | 110.0 | 1 |
| Treatment ED | 110.8 | 0.1 | 110.8 | 1 |
| Treatment EE | 111.5 | 0.1 | 111.5 | 1 |
| Treatment EF | 112.2 | 0.1 | 112.2 | 1 |
| Treatment EG | 113.0 | 0.1 | 113.0 | 1 |
| Treatment EH | 113.8 | 0.1 | 113.8 | 1 |
| Treatment EI | 114.5 | 0.1 | 114.5 | 1 |
| Treatment EJ | 115.2 | 0.1 | 115.2 | 1 |
| Treatment EK | 116.0 | 0.1 | 116.0 | 1 |
| Treatment EL | 116.8 | 0.1 | 116.8 | 1 |
| Treatment EM | 117.5 | 0.1 | 117.5 | 1 |
| Treatment EN | 118.2 | 0.1 | 118.2 | 1 |
| Treatment EO | 119.0 | 0.1 | 119.0 | 1 |
| Treatment EP | 119.8 | 0.1 | 119.8 | 1 |
| Treatment EQ | 120.5 | 0.1 | 120.5 | 1 |
| Treatment ER | 121.2 | 0.1 | 121.2 | 1 |
| Treatment ES | 122.0 | 0.1 | 122.0 | 1 |
| Treatment ET | 122.8 | 0.1 | 122.8 | 1 |
| Treatment EU | 123.5 | 0.1 | 123.5 | 1 |
| Treatment EV | 124.2 | 0.1 | 124.2 | 1 |
| Treatment EW | 125.0 | 0.1 | 125.0 | 1 |
| Treatment EX | 125.8 | 0.1 | 125.8 | 1 |
| Treatment EY | 126.5 | 0.1 | 126.5 | 1 |
| Treatment EZ | 127.2 | 0.1 | 127.2 | 1 |
| Treatment FA | 128.0 | 0.1 | 128.0 | 1 |
| Treatment FB | 128.8 | 0.1 | 128.8 | 1 |
| Treatment FC | 129.5 | 0.1 | 129.5 | 1 |
| Treatment FD | 130.2 | 0.1 | 130.2 | 1 |
| Treatment FE | 131.0 | 0.1 | 131.0 | 1 |
| Treatment FF | 131.8 | 0.1 | 131.8 | 1 |
| Treatment FG | 132.5 | 0.1 | 132.5 | 1 |
| Treatment FH | 133.2 | 0.1 | 133.2 | 1 |
| Treatment FI | 134.0 | 0.1 | 134.0 | 1 |
| Treatment FJ | 134.8 | 0.1 | 134.8 | 1 |
| Treatment FK | 135.5 | 0.1 | 135.5 | 1 |
| Treatment FL | 136.2 | 0.1 | 136.2 | 1 |
| Treatment FM | 137.0 | 0.1 | 137.0 | 1 |
| Treatment FN | 137.8 | 0.1 | 137.8 | 1 |
| Treatment FO | 138.5 | 0.1 | 138.5 | 1 |
| Treatment FP | 139.2 | 0.1 | 139.2 | 1 |
| Treatment FQ | 140.0 | 0.1 | 140.0 | 1 |
| Treatment FR | 140.8 | 0.1 | 140.8 | 1 |
| Treatment FS | 141.5 | 0.1 | 141.5 | 1 |
| Treatment FT | 142.2 | 0.1 | 142.2 | 1 |
| Treatment FU | 143.0 | 0.1 | 143.0 | 1 |
| Treatment FV | 143.8 | 0.1 | 143.8 | 1 |
| Treatment FW | 144.5 | 0.1 | 144.5 | 1 |
| Treatment FX | 145.2 | 0.1 | 145.2 | 1 |
| Treatment FY | 146.0 | 0.1 | 146.0 | 1 |
| Treatment FZ | 146.8 | 0.1 | 146.8 | 1 |
| Treatment GA | 147.5 | 0.1 | 147.5 | 1 |
| Treatment GB | 148.2 | 0.1 | 148.2 | 1 |
| Treatment GC | 149.0 | 0.1 | 149.0 | 1 |
| Treatment GD | 149.8 | 0.1 | 149.8 | 1 |
| Treatment GE | 150.5 | 0.1 | 150.5 | 1 |
| Treatment GF | 151.2 | 0.1 | 151.2 | 1 |
| Treatment GG | 152.0 | 0.1 | 152.0 | 1 |
| Treatment GH | 152.8 | 0.1 | 152.8 | 1 |
| Treatment GI | 153.5 | 0.1 | 153.5 | 1 |
| Treatment GJ | 154.2 | 0.1 | 154.2 | 1 |
| Treatment GK | 155.0 | 0.1 | 155.0 | 1 |
| Treatment GL | 155.8 | 0.1 | 155.8 | 1 |
| Treatment GM | 156.5 | 0.1 | 156.5 | 1 |
| Treatment GN | 157.2 | 0.1 | 157.2 | 1 |
| Treatment GO | 158.0 | 0.1 | 158.0 | 1 |
| Treatment GP | 158.8 | 0.1 | 158.8 | 1 |
| Treatment GQ | 159.5 | 0.1 | 159.5 | 1 |
| Treatment GR | 160.2 | 0.1 | 160.2 | 1 |
| Treatment GS | 161.0 | 0.1 | 161.0 | 1 |
| Treatment GT | 161.8 | 0.1 | 161.8 | 1 |
| Treatment GU | 162.5 | 0.1 | 162.5 | 1 |
| Treatment GV | 163.2 | 0.1 | 163.2 | 1 |
| Treatment GW | 164.0 | 0.1 | 164.0 | 1 |
| Treatment GX | 164.8 | 0.1 | 164.8 | 1 |
| Treatment GY | 165.5 | 0.1 | 165.5 | 1 |
| Treatment GZ | 166.2 | 0.1 | 166.2 | 1 |
| Treatment HA | 167.0 | 0.1 | 167.0 | 1 |
| Treatment HB | 167.8 | 0.1 | 167.8 | 1 |
| Treatment HC | 168.5 | 0.1 | 168.5 | 1 |
| Treatment HD | 169.2 | 0.1 | 169.2 | 1 |
| Treatment HE | 170.0 | 0.1 | 170.0 | 1 |
| Treatment HF | 170.8 | 0.1 | 170.8 | 1 |
| Treatment HG | 171.5 | 0.1 | 171.5 | 1 |
| Treatment HH | 172.2 | 0.1 | 172.2 | 1 |
| Treatment HI | 173.0 | 0.1 | 173.0 | 1 |
| Treatment HJ | 173.8 | 0.1 | 173.8 | 1 |
| Treatment HK | 174.5 | 0.1 | 174.5 | 1 |
| Treatment HL | 175.2 | 0.1 | 175.2 | 1 |
| Treatment HM | 176.0 | 0.1 | 176.0 | 1 |
| Treatment HN | 176.8 | 0.1 | 176.8 | 1 |
| Treatment HO | 177.5 | 0.1 | 177.5 | 1 |
| Treatment HP | 178.2 | 0.1 | 178.2 | 1 |
| Treatment HQ | 179.0 | 0.1 | 179.0 | 1 |
| Treatment HR | 179.8 | 0.1 | 179.8 | 1 |
| Treatment HS | 180.5 | 0.1 | 180.5 | 1 |
| Treatment HT | 181.2 | 0.1 | 181.2 | 1 |
| Treatment HU | 182.0 | 0.1 | 182.0 | 1 |
| Treatment HV | 182.8 | 0.1 | 182.8 | 1 |
| Treatment HW | 183.5 | 0.1 | 183.5 | 1 |
| Treatment HX | 184.2 | 0.1 | 184.2 | 1 |
| Treatment HY | 185.0 | 0.1 | 185.0 | 1 |
| Treatment HZ | 185.8 | 0.1 | 185.8 | 1 |
| Treatment IA | 186.5 | 0.1 | 186.5 | 1 |
| Treatment IB | 187.2 | 0.1 | 187.2 | 1 |
| Treatment IC | 188.0 | 0.1 | 188.0 | 1 |
| Treatment ID | 188.8 | 0.1 | 188.8 | 1 |
| Treatment IE | 189.5 | 0.1 | 189.5 | 1 |
| Treatment IF | 190.2 | 0.1 | 190.2 | 1 |
| Treatment IG | 191.0 | 0.1 | 191.0 | 1 |
| Treatment IH | 191.8 | 0.1 | 191.8 | 1 |
| Treatment II | 192.5 | 0.1 | 192.5 | 1 |
| Treatment IJ | 193.2 | 0.1 | 193.2 | 1 |
| Treatment IK | 194.0 | 0.1 | 194.0 | 1 |
| Treatment IL | 194.8 | 0.1 | 194.8 | 1 |
| Treatment IM | 195.5 | 0.1 | 195.5 | 1 |
| Treatment IN | 196.2 | 0.1 | 196.2 | 1 |
| Treatment IO | 197.0 | 0.1 | 197.0 | 1 |
| Treatment IP | 197.8 | 0.1 | 197.8 | 1 |
| Treatment IQ | 198.5 | 0.1 | 198.5 | 1 |
| Treatment IR | 199.2 | 0.1 | 199.2 | 1 |
| Treatment IS | 200.0 | 0.1 | 200.0 | 1 |
| Treatment IT | 200.8 | 0.1 | 200.8 | 1 |
| Treatment IU | 201.5 | 0.1 | 201.5 | 1 |
| Treatment IV | 202.2 | 0.1 | 202.2 | 1 |
| Treatment IW | 203.0 | 0.1 | 203.0 | 1 |
| Treatment IX | 203.8 | 0.1 | 203.8 | 1 |
| Treatment IY | 204.5 | 0.1 | 204.5 | 1 |
| Treatment IZ | 205.2 | 0.1 | 205.2 | 1 |
| Treatment JA | 206.0 | 0.1 | 206.0 | 1 |
| Treatment JB | 206.8 | 0.1 | 206.8 | 1 |
| Treatment JC | 207.5 | 0.1 | | |

To the north and northwest of the Cotton Plantation Area lay the Cotton Farming Area, where whites constituted a majority of the population at all times before the Civil War and where farms were on the average smaller than in the area to the southwest. (Hereafter the term Cotton Area is used in referring to the Cotton Plantation Area and the Cotton Farming Area together.) Although commercial production of cotton in the Farming Area lagged behind that in the Plantation Area, by 1839 large crops were being produced in many counties. In the last decade before the Civil War there was a marked upward trend in production in the Cotton Farming Area. (See Appendix No. II, Tables No. 2 and 3.) The counties and districts nearest the upper border of the Piedmont and in western central North Carolina were in a zone where the growing season was so short that the cotton could not always be depended upon to mature, under conditions of culture and fertilization that prevailed before the introduction of commercial fertilizers. Because of this, and the distance from market, these were mainly general farming areas in the antebellum period.⁹

Until the 1840's the principal means of transportation to coastal markets for the Cotton Area were by the rivers or overland over miserable roads. Construction of canals around the principal falls and the Santee Canal connecting Charleston with the Santee

⁹D. B. Warden, op. cit., v. 2, p. 441; Anon., "Cotton Low--Negroes High," The Spartan (Spartanburg, S. C.), Aug. 28, 1851, p. 2; Anon., "North Carolina Trade," Spartanburg Express, Feb. 8, 1860, p. 2; U. S. Patent Office Reports, Agriculture, 1851, pp. 318-322; 1853, p. 199.

River enabled "cotton boxes" and pole boats to reach the coast from points far in the interior. Columbia was linked to Charleston by rail in 1844, a railroad from Augusta to Charleston was completed in 1839 and from Augusta to Savannah in 1845. Augusta and Atlanta were connected by rail also in 1845. By 1857 the rail systems of Georgia, South Carolina, and North Carolina were linked, and Savannah was connected by way of Atlanta with north-west Georgia and Tennessee.¹⁰ The coming of the railroads stimulated the increase of cotton cultivation in the Cotton Farming Area. By making commercial fertilizers available and making cotton production more profitable, rail transportation encouraged improvement in production methods.

Cotton Crop Management

The methods of cultivating cotton were at first quite varied. Many farmers at first planted cotton in hills, like tobacco. Eventually certain standard procedures were adopted, although differences from area to area and from farm to farm remained. The land was broken with a two-horse turning plow either in the fall or in the spring. Parallel ridges were then thrown up at distances of three to four or five feet apart. A small drill plow then passed along the tops of the ridges opening a furrow

10. U. B. Phillips, The History of Transportation in the Eastern Cotton Belt to 1860 (New York, 1908), pp. 82-89, 153, 174-175, 216-243, 336-348; Weaver, Internal Improvements in N. C., p. 90.

Highly variable results might be expected from such a survey.
The results are in the following table. The results are in the following table.
and Atlanta were connected by rail line in 1845. By 1857 the
rail system of Georgia, South Carolina, and Florida was
linked, and Savannah was connected by way of Atlanta with north-
west Georgia and Tennessee.¹⁰ The coming of the railroad system
brought the increase of cotton cultivation in the Cotton Belt
area. By 1860, the cotton production of Georgia and South Carolina
was 100,000 and 150,000 bales, respectively, and the production of
Alabama in production methods.

Cotton Crop Management

The methods of cultivating cotton were in 1840 very different
from those of 1860. The first planting was in April, the second
usually certain standard procedures were adopted, although
differences from area to area and from farm to farm remained.
The land was broken with a two-horse turning plow either in the
fall or in the spring. Parallel ridges were then thrown up at
distances of three to four or five feet apart. A small drill
was then passed along the tops of the ridges opening a narrow

10. R. H. Rouse, *History of the Cotton Industry in the United States*, pp. 10-11.
11. *History of the Cotton Industry in the United States*, pp. 10-11.

in which the seed was planted. After the young cotton came up it was thinned and then cultivated as often as necessary with a light one-horse plow or harrow and hoes in order to destroy the weeds. The distance between rows and between separate stalks within the row depended upon the fertility of the soil and, to some extent, the length of growing season. One school of thought believed that rows should be oriented north and south, so that the plants would receive full benefit of sunlight, although careful planters realized that on hilly lands the exposure to gully-ing caused by this practice would outweigh any benefits. Many careless planters did not break cotton land after the first crop, if the land was planted to cotton several years in succession. They knocked down the stalks of the previous year's crop and planted the seed for the new crop in the old ridges, although they did plow and hoe the crop later to kill weeds and stir the earth. Land managed in this fashion became hard during summer droughts, exposing the crops to great injury.¹¹

In the earlier decades of the nineteenth century it was not customary to plant cotton on newly cleared lands. The land was first cultivated in some other crop for one or two years to clear it of weeds and roots. After this a field might be planted to

11. Robert Moore, "On Planting Cotton," in N. C. Board of Agri., Papers on Agricultural Subjects, pp. 143-155; O. C. Stine and O. E. Baker, Atlas of American Agriculture, Part V, Section A, Cotton, U.S.D.A., Office of Farm Management (Washington, 1918), p. 21; F. West to George W. West, Cedar Hill, Greene Co., Ga., April 22, 1838, in George W. West Collection, Polk Co., Ga., MSS, Duke University Library.

cotton or cotton and corn alternately, for ten or twenty years or as long as it remained productive. Manure was rarely used.¹² In the 1840's rotations consisting of cotton, corn, and small grain in succession were in rather widespread use. Under the triple stimulus of depleted fertility, competition from virgin western lands, and the long depression of this decade, farmers also devoted more attention to manuring. Compost made from manure, swamp muck, and leaves was used, but the area that could be fertilized by this method was limited. The arts of animal husbandry were so little practiced that only a small amount of manure was saved.¹³ Peas, which had formerly been interplanted with corn, were also sometimes introduced into rotations with cotton and small grains as a green manuring crop.¹⁴

First introduced into South Carolina in 1845, Peruvian and other guanos were used experimentally until the late 1850's. Early applications to the cotton crop were at rates of from 125 to 300 pounds to the acre, applied under the drill, or perhaps in the drill in immediate contact with the cotton. Broadcasting of

12. Moore, loc. cit., p. 144; David P. Hillhouse, "Outlines of the Agricultural System," Sou. Agri. (Charleston), 1st ser. v. 3 (March 1830), pp. 121-124.

13. Garnett Andrews, "Georgia Lands and Agriculture," Amer. Agriculturist, v. 3 (April 1844), pp. 117-119; John Cunningham, "Improvement of Soils--Manuring--Rotation of Crops--Labor Saving Machines, &c.," Sou. Cult., 1st ser., v. 10 (Sept. 1852), pp. 268-269.

14. A. R. Hall, The Story of Soil Conservation in the South Carolina Piedmont, 1800-1860, U.S.D.A. Misc. Publ. No. 407 (Washington, 1940), pp. 14-17; Anon., "Improvement of Land," by Colo, Sou. Cult., 1st ser., v. 8 (Nov. 1850), p. 162.

in the 1880's rotations consisting of cotton, corn, and small
grains in various ways in which the land was used. The
value of the land of depleted fertility, competition from virgin
land, and the loss of the land to the cotton plant
also brought more attention to farming. The report made from
many, many years, and leaves was used, but the area that could
be fertilized by this method was limited. The area of small
plots was so little practical that only a small amount of
fertilizer was used. The area, which had formerly been infertile
with corn, was also sometimes introduced into rotations with
cotton and small grains in a few seasons.
The land introduced into South Carolina in 1881, however, in
which cases were used experimentally until the late 1880's.
Early applications to the cotton crop were at rates of from 100
to 200 pounds to the acre, applied under the drill, or broadcast in
the fall in immediate contact with the cotton. The amount of

18. *Journal of the Agricultural Experiment Station, University of Georgia*, Vol. 1, 1881-1882.
19. *Journal of the Agricultural Experiment Station, University of Georgia*, Vol. 1, 1881-1882.
20. *Journal of the Agricultural Experiment Station, University of Georgia*, Vol. 1, 1881-1882.
21. *Journal of the Agricultural Experiment Station, University of Georgia*, Vol. 1, 1881-1882.
22. *Journal of the Agricultural Experiment Station, University of Georgia*, Vol. 1, 1881-1882.
23. *Journal of the Agricultural Experiment Station, University of Georgia*, Vol. 1, 1881-1882.
24. *Journal of the Agricultural Experiment Station, University of Georgia*, Vol. 1, 1881-1882.
25. *Journal of the Agricultural Experiment Station, University of Georgia*, Vol. 1, 1881-1882.
26. *Journal of the Agricultural Experiment Station, University of Georgia*, Vol. 1, 1881-1882.
27. *Journal of the Agricultural Experiment Station, University of Georgia*, Vol. 1, 1881-1882.
28. *Journal of the Agricultural Experiment Station, University of Georgia*, Vol. 1, 1881-1882.
29. *Journal of the Agricultural Experiment Station, University of Georgia*, Vol. 1, 1881-1882.
30. *Journal of the Agricultural Experiment Station, University of Georgia*, Vol. 1, 1881-1882.

the guano in the fall was also recommended. Considerable increases in yields in cotton and other crops were reported from its use, as instanced by the claim from Laurens County, South Carolina of a difference in yield of 1,100 pounds of seed cotton between an acre on which 200 pounds of guano had been used and an adjacent unmanured area. Superphosphates, made by treating animal bones with sulphuric acid, were introduced commercially about 1854, and not long after "manipulated" fertilizers consisting of mixtures of guano, phosphates and other materials were on the market.¹⁵ In 1858 the railways of Georgia gave an impetus to the use of commercial fertilizers by reducing rates on them. The Central of Georgia Railway increased the amount of fertilizers handled from about 4 million pounds in 1859 to nearly 17 million pounds in 1860. Most of these imports consisted of guano.¹⁶ At the same time many brands of guano and manufactured fertilizers were offered for sale at remote rail points in South Carolina where fertilizing materials had previously been difficult to secure.¹⁷

The introduction of the sweep for cultivating cotton near the end of the antebellum period greatly reduced the amount of horse

15. Rosser H. Taylor, "Commercial Fertilizers in South Carolina," South Atlantic Quarterly, v. 29 (April 1930), pp. 179-189; Taylor, "The Sale and Application of Commercial Fertilizers in the South Atlantic States to 1900," Agri. Hist., v. 21 (January 1947), pp. 46-52; Anon., "The Use and Value of Guano," Sou. Agri. (Laurensville, S. C.), v. 1 (April 1853), pp. 103-104; Wm. D. Conyers, "Guano on Cotton," Amer. Farmer, 4th ser., v. 10 (Oct. 1854), p. 109; Anon., "Guano," Farmer and Planter, 1st ser., v. 5 (Oct. 1854), p. 253; Anon., "Guano for Cotton," by Laurens, Farmer and Planter, 1st ser., v. 5 (March 1854), pp. 56-57.

16. Stine and Baker, op. cit., p. 20.

17. Spartanburg Express (Spartanburg, S. C.), Jan. 25, 1860, p. 3.

the system in the fall and winter months. The system is similar to that in use in the United States.

The system is based on the principle of the claim from Lannan County, South Carolina. It is a system of irrigation in which the water is used in a different way than in the United States.

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and hoe labor required in weeding out the crop. One type of this instrument was popularized by David Dickson, a progressive and influential planter of Hancock County, Georgia.¹⁸ Contour plowing and hillside ditching as methods of controlling soil erosion, although probably practiced in Virginia before they were farther south, eventually came into much more widespread use in the cotton areas than in the tobacco areas. (See Chapter VII.)

Here, as in the tobacco districts in the early years, the river bottoms were the most valuable lands. In South Carolina about 1825 Piedmont bottom lands ranged in value from \$5 to \$50 per acre and uplands from as low as 50 cents to about \$10 per acre.¹⁹ The bottoms, however, were generally reserved for the grain crops. Cotton was usually planted on sandy uplands, especially in the earlier years when the green-seed variety was used. This cotton would not thrive in the dampness of low ground except in dry seasons. Mexican, or white seed cotton, which later became a favorite variety, could be raised on low ground. Nevertheless it seems that most of the cotton continued to be planted on uplands.²⁰ The bottoms along small streams were not utilized as

18. David Dickson, A Practical Treatise on Agriculture, to which is Added the Author's Published Letters, edited by J. Dickson Smith (Macon, Ga., 1870), pp. 50-51.

19. Robert Mills, Statistics of South Carolina, Including a View of its Natural, Civil and Military History, General and Particular (Charleston, 1826), pp. 676-677, 759.

20. Ibid., p. 641; Robert Moore, loc. cit., p. 143; Marjorie Stafford Mendenhall, A History of Agriculture in South Carolina, 1790-1860. An Economic and Social Study, Ph.D. Dissertation, University of North Carolina (Chapel Hill, N. C., 1940), Chap. 5.

the stress that is the tobacco stress. (See Chapter VII.)

[illegible]

extensively as nearby uplands because of the danger from floods. In some areas by the 1840's erosion on upland fields and deposition on the creek bottoms had reduced the fertility of the former but increased that of the latter. Planters had begun to ditch and drain the creek bottoms and put them to greater use.²¹

Upland soils of little value for cotton production included the "black jack" lands (Iredell and Mecklenburg series) and some of the soils derived from the slate rock. Because of their poor interior drainage they were later in drying in the spring than the sandy upland soils. Their tendency to adhere to the plow made tillage difficult. Cotton on blackjack lands had a tendency to rust and "french." Much of the slate belt was considered of secondary agricultural value in the antebellum period.²² Some of these soils, in the Mecklenburg, Georgeville, and Alamance series were of value for the production of grains, grasses, and legumes, however, and were used for general farming.

The production of cotton per acre varied from less than 100 pounds to about 400 pounds of ginned cotton, depending on the soil, season, and culture. About 150 to 250 pounds per acre was considered an average crop for the area as a whole. On

21. Anon., "The Growing Crops," by A Planter, Sou. Cult., 1st ser., v. 8 (June 1850), p. 90; Garnett Andrews, loc. cit.

22. Mills, op. cit., p. 132; Lieber, Survey of S. C., First Report, pp. 24, 106-109; also compare county data on value per acre in [North Carolina], Statistical Tables of the Population, Agriculture, Commerce, and Finances of North Carolina (Raleigh, 1816), pp. 10-11.

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experimental or "prize" plots as much as 550 pounds was secured.²³ Data on yields before the Civil War were based almost entirely on estimates, and are not sufficient to warrant conclusions regarding trends in yield per acre.

Management of Other Crops and Livestock

Within ten or fifteen years after the beginning of commercial cotton production in the Piedmont, this section, which had formerly exported corn, wheat, and other supplies to the coastal plantations and ports, was consuming most of its own grain production and exporting the fleecy staple primarily.²⁴ The Napoleonic wars and the War of 1812 retarded the tendency toward one-crop economy until about 1816. After the wars, concentration on cotton and consequent neglect of provision crops was greater, and continued until the early 1840's, not being affected greatly by the depression in cotton prices of the period 1819-1831. During this period breadstuffs, feed, hogs, and cattle were imported from Kentucky, Tennessee, and the North to make up the deficiencies of the cotton areas. After 1840 the importation of supplies declined somewhat as cotton production became less profitable, and there was

²³ Drayton, op. cit., p. 132; Mills, op. cit., p. 641; Patent Office Reports, Agriculture, 1852, pp. 90, 94; 1853, p. 199; 1854, p. 185; Peter Cox, "Mode of Cultivating Cotton," N. C. Planter, 1st ser., v. 3 (March 1860), p. 84.

²⁴ Ramsey, op. cit., p. 305; Phillips, Hist. of Transportation, p. 42.

...plots as much as 250 pounds was secured.
...and are not sufficient to warrant conclusions re-
...in yield per acre.

Management of Other Crops and Livestock

Within ten or fifteen years after the beginning of cotton production in the Mississippi Valley, the cotton planters of the Mississippi Valley began to diversify their crops. They began to raise other crops, such as wheat, corn, and soybeans, and to raise livestock, such as hogs, cattle, and sheep. This diversification was necessary because the cotton crop was subject to great fluctuations in price, and the planters needed a more stable source of income. The diversification of crops and livestock also helped to improve the soil and to reduce the risk of crop failure. By the early 1890's, the diversification of crops and livestock had become a common practice among cotton planters in the Mississippi Valley. This diversification was a major factor in the development of the cotton industry in the Mississippi Valley.

...the cotton crop was subject to great fluctuations in price, and the planters needed a more stable source of income. The diversification of crops and livestock also helped to improve the soil and to reduce the risk of crop failure. By the early 1890's, the diversification of crops and livestock had become a common practice among cotton planters in the Mississippi Valley. This diversification was a major factor in the development of the cotton industry in the Mississippi Valley.

greater attention to the raising of home supplies.²⁵ Of the three agricultural censuses before the Civil War, that for 1849 recorded the greatest corn and oats crops and that for 1859 the greatest wheat crop. There was an increase in the production of corn and wheat in the Cotton Farming Area between 1839 and 1859, but these crops decreased slightly between the two dates in the Plantation Area. (See Appendix No. II, Tables No. 2 and 3.)

The average farmer planted as large an acreage of provision crops as he could cultivate and harvest without undue interference with cotton. Perfectionists among the agricultural reformers might decry the necessity for buying hay, butter, cheese, and other provisions outside the region, but prudent men, while raising as much of these things as they could for the provisioning of themselves and their slaves, still concentrated on the crop that would bring the largest cash return. Next to cotton, therefore, the largest acreage was generally in corn; peas and beans, wheat, and oats were produced in fair quantity, and the major share of the plantation's requirements of pork was home grown.²⁶ Many plantations that found it necessary to buy corn or hogs in some years were able to produce a surplus for local sale in other more

25. Mendenhall, op. cit., Chapters 3 and 9. Miss Mendenhall suggests that the trend toward diversification in the period 1845-1860 was so great that the South Carolina Piedmont was on the verge of becoming an animal industry section just before the Civil War.

26. David P. Hillhouse, loc. cit., pp. 121-124; John Cunningham, loc. cit., pp. 268-269.

favorable years.²⁷

Corn was planted and cultivated in much the same way as in the Tobacco and Mixed Farming Area, described in Chapter III, and the improvements introduced were along similar lines. Contour cultivation gradually replaced cross plowing and planting in hills. As the bar share plow and other heavy plows were introduced to replace the more primitive shovel plow, deeper plowing and more thorough breaking were possible. Subsoil plowing, and deep plowing in general, was advocated by some writers but assailed by others. Some planters, apparently with good reason, opposed the deep turning of soils having thin surface layers underlain by sterile sandy or sandy clay subsoils. It was said, for instance, that the abandonment of much land in western Georgia having soil of this character was due to plowing it deeply and bringing the non-productive subsoil to the surface. The reformers answered that planters who did this failed to understand how subsoil plowing should be done.²⁸

All of the cotton seed except that saved for planting was waste material before the establishment of cotton oil and meal

27. Francis W. Pickens, "Plantation Book, Edgefield Dist., S. C., 1839-1864," MSS, Duke University Library; E. G. Palmer, "Plantation Book, Fairfield Dist., S. C., 1824-1862," MSS, owned by Mrs. E. G. Palmer, III, Ridgeway, S. C. Table No. 5, compiled in part for this source, gives an idea of the relative acreage and production of different crops in different years, on a fair-sized plantation, and indicates how variation in yield was a factor in lack of self-sufficiency.

28. Anon., "Subsoiling," by Upatoie, Sou. Cult., 1st ser., v. 10 (Feb. 1852), p. 52; J. R. Earle, [Deep Plowing], Farmer and Planter, 1st ser., v. 4 (July 1853), p. 134.

... was planted and cultivated in much the same way as in
the United States and other countries. The
the experiments introduced were along similar lines. German
... gradually replaced cross plowing and sowing in
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and more thorough breaking were possible. Special plowing, and
... in general, was advocated by some writers but as-
... of which, ...
... the best plowing of all ...
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... of this character was due to plowing it deeply and
... the non-productive subsoil to the surface. The reason
... that plowmen who did this failed to understand how sub-
...
All of the ...
... the establishment of cotton and rice

... V. Plowman, "Plantation Book, Whitfield Dist., S. C.,
... 1850-1855, ...
... 1850-1855, ...
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... 1850-1855, ...
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Table No. 5

Plantation of E. G. Palmer,
Fairfield Co., S. C.

| | | <u>1826</u> | <u>1829</u> | <u>1830</u> | <u>1859-1860</u> |
|-------------------|--|----------------------------------|-------------|--|---|
| Total acreage | | 1,742 | 1,742 | 1,742 | 3,000 (incl.
2,200
"Im-
proved") |
| Cotton | a. 205 | 201 | 224 | -- | |
| | lb. ginned | 42,640 | 41,672 | 37,167 | 58,400 |
| Corn | a. 177 | 116 | 120 | -- | |
| | bu. 1,903 | 1,844 | 1,296 | 4,000 | |
| Wheat | a. -- | 11 | -- | -- | |
| | bu. -- | 99 | -- | 225 | |
| Oats | bu. (Not listed for these yrs.,
but mentioned in 1836.) | | | | 1,200 |
| Peas &
beans | bu. 400 | -- | -- | 500 | |
| Sweet
potatoes | a. -- | 2-1/2 | -- | -- | |
| | bu. -- | -- | -- | 150 | |
| Other | -- | 1/2 a. rice
1/4 a. sugar cane | -- | 50 tons hay | |
| Remarks | | Sold
400 bu.
corn | | Bought
150 bu.
corn in
Charleston.
Dryest year
known. | |

Sources: E. G. Palmer Plantation Book for 1826, 1829, and 1830; Eighth Census of U.S., Agriculture, 1860, Fairfield District, S. C., MSS, South Carolina State Library, Columbia, for 1859-1860.

Table No. 5
 Vintages of E. & F. Palmer
 Fairfield Co., N. C.

| Total average | 1935 | | 1936 | | 1937 | | 1938 | | 1939 | |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | Acres | Yield | Acres | Yield | Acres | Yield | Acres | Yield | Acres | Yield |
| 1935 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 |
| 1936 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 |
| 1937 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 |
| 1938 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 |
| 1939 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 | 100 | 1,000 |

Source: E. & F. Palmer Vintages Book for 1935, 1936, 1937, and 1938;
 Rights Reserved to E. & F. Palmer, 1935, 1936, 1937, and 1938;
 E. & F. Palmer, Fairfield Co., N. C.

mills in the latter part of the century. By 1840 many planters were manuring their corn with cotton seed, partly as a means of disposing of the seed.²⁹ This was perhaps the cheapest and most easily obtained manure for corn in the cotton districts before the advent of commercial fertilizers.

The yield per acre of corn varied from somewhat more than 10 bushels to about 30 bushels on upland and from about 30 to about 50 bushels on low grounds. By applying composts of barnyard manure, leaves, and muck, yields of as much as 80 bushels per acre on upland were obtained. Guano does not seem to have been used as much for corn as for cotton for some time after its introduction.³⁰

Wheat was sown in the fall, generally on land that had been in corn the previous summer, thus serving as a winter cover crop to protect the corn land. It was plowed in and then cross plowed or harrowed to distribute the seed evenly. The yield per acre was about 4 to 15 bushels, although yields of as much as 29 bushels were obtained with the use of cotton seed or guano fertilizers.³¹ Wheat would thrive better on the "mulatto lands" (Davidson clay loam and Cecil clay loam) than would the other

29. Anon., "On Making Manures," by Colleton, Southern Cabinet, v. [1] (Sept. 1840), pp. 518-519.

30. Patent Office Report, Agri., 1852, pp. 83, 90, 94; Garnett Andrews, loc. cit., pp. 117-119; E. G. Palmer Plantation Book.

31. Patent Office Reports, Agri., 1852, pp. 82, 315; R. Peters "Trial of Guano in Georgia," Sou. Cult., 1st ser., v. 10 (Sept. 1852), p. 269; Anon., "Guano on Wheat," by Middle Georgia, Sou. Cult., 1st ser., v. 17 (Dec. 1859), p. 360.

while in the latter part of the century. By 1860 many plantations were owned by their own men with entire independence as a group in disposing of the land.¹⁰ This was perhaps the cheapest and most easily obtained source for men in the early nineteenth century. The object of commercial cultivation.

The first part of the century was marked by a number of small plantations in about 20 families on sugar and then about 30 to about 50 families on low grounds. By 1860 the number of small plantations, sugar, tobacco, and other, which it is said as the islands have been on sugar were obtained. Sugar does not seem to have been used as much for men as for others but some time after 1860.

There was much in the field generally on land than in the past in the early century. The number of small plantations was about 20 to 30 families, although it is said as 20 families were obtained from the use of sugar and tobacco for-
tation.¹¹ About 1860 the number of the islands was about 20 families (sugar and tobacco) and about 1860 the number of the islands was about 20 families.

10. "The Sugar Industry," by William, Frederick, 1860.
11. "The Sugar Industry," by William, Frederick, 1860.
12. "The Sugar Industry," by William, Frederick, 1860.
13. "The Sugar Industry," by William, Frederick, 1860.
14. "The Sugar Industry," by William, Frederick, 1860.
15. "The Sugar Industry," by William, Frederick, 1860.
16. "The Sugar Industry," by William, Frederick, 1860.
17. "The Sugar Industry," by William, Frederick, 1860.
18. "The Sugar Industry," by William, Frederick, 1860.
19. "The Sugar Industry," by William, Frederick, 1860.
20. "The Sugar Industry," by William, Frederick, 1860.

small grains, cotton, or corn.³² The cultivation of wheat as a staple for export, which to some extent had characterized the period before 1800, was abandoned and the costly flour mills built in the up-country fell into disuse. Flour became an article of import. After western competition had made cotton less profitable in the Piedmont, the region turned once more to wheat production and cut down its dependence on outside supply by the late 1840's.³³

Oats were sown in the fall or spring, but preference seems to have been for the spring-sown crop. The yields were from 6 to 30 bushels per acre. Less attention was paid to this than to the other principal crops, and it was sown only on second or third quality land not thought suitable for cotton, corn, or wheat, or on land that had been depleted by the other crops. Perhaps for this reason oats were considered as exhausting to the soil.³⁴ Barley and rye were cultivated to only a small extent. Sweet potatoes, Irish potatoes, and other vegetables were raised to supply the needs of nearly every plantation, but the total acreage was negligible. Peas and beans, planted among the corn at the

32. Mills, op. cit., p. 641.

33. Ramsey, op. cit., v. 2, pp. 216-217; Wm. Terrell, "Crops in Middle Georgia," Amer. Agriculturist, v. 5 (Sept. 1846), pp. 279-280.

34. Anon., "Observations on the Oat Crop," by a Highlander, Sou. Agri. (Charleston), 1st ser., v. 6 (March 1833), pp. 584-585; Patent Office Reports, Agri., 1851, p. 323; 1852, pp. 82, 90, 94; Anon., "Letter on the Importance of Agricultural Schools and Agricultural Conventions, with Remarks by the Editor," Sou. Agri. (Charleston), 1st ser., v. 12 (June 1839), pp. 296-298.

time of the last cultivating, or more rarely planted alone, had been used as food for man and beast since colonial times. Their value as fertilizing crops was understood and after about the second decade of the century the practice of plowing under pea vines to fertilize the succeeding corn or other crop gained in popularity. Peas were referred to as the "clover of the South." Nevertheless, the potential source of nitrogen represented by pea vines continued to be entirely neglected on many farms.³⁵

The raising of livestock was even more neglected in the cotton areas than in the Tobacco and Mixed Farming Area. The countryside continued to be open range, and the animals were forced to rely upon native pasture or the gleanings from harvested fields. The fences around cultivated fields were usually thrown down for this purpose after the crops were taken off. Very few sheep were raised, and until after 1840 the local production of cattle, horses, mules, and hogs was so small that it had to be supplemented by importation from the north and west.³⁶ In the second and third decades of the nineteenth century agricultural reformers, influenced by the teachings of John Taylor of Virginia,

35. William R. Davie, "An Address Delivered Before the South Carolina Agricultural Society," Amer. Farmer, 1st ser., v. 1 (Oct. 8, 1819), pp. 218-219; David P. Hillhouse, "Outlines of An Agricultural System," Sou. Agri. (Charleston), 1st ser., v. 3 (March 1830), pp. 120-124; Robert Watts, "On the Cotton and Pea Crop & Ploughing, &c.," Sou. Agri. (Charleston), 1st ser., v. 8 (Aug. 1835), pp. 452-456; Edmund Ruffin, Report on the Commencement and Progress of the Agricultural Survey of South Carolina, for 1843 (Columbia, 1843), p. 97; Patent Office Reports, Agri., 1851 pp. 319, 322.

36. Mills, op. cit., pp. 678, 776.

that of the last half-century, it is not possible to say that the
pasture land has been reduced to any great extent. The
value of the land is not so much reduced as it was in the
pasture land of the century of growing under the
value of the land the increasing cost of other crops and in
particular. It was referred to as the "cotton of the South."
Nevertheless, the potential source of nitrogen represented by the
value of the land is not entirely negligible in the past.

The value of livestock was even more neglected in the past
than was that in the tobacco and mixed farming areas. The con-
tinued continued to be open range, and the animals were taken
to the open range pasture on the plains from the
tobacco. The tobacco and mixed farming areas were usually taken
to the open range after the crops were taken off. Very few
crops were raised, and until after 1880 the local production of
cattle, horses, mules, and hogs was so small that it had to be
supplied by importation from the West. In the
pasture and third decades of the nineteenth century agricultural
production, influenced by the teachings of John Taylor of Virginia,

TO THE HONORABLE SENATE OF THE UNITED STATES
IN SENATE, FEBRUARY 18, 1880.
REPORT OF THE COMMISSIONERS OF THE GENERAL LAND OFFICE
ON THE LANDS OF THE UNITED STATES
IN THE YEAR 1879.
PUBLISHED BY THE GENERAL LAND OFFICE, WASHINGTON, D. C.
1880.

advocated that cultivated fields should be continuously "enclosed" from the stock, and the crop residues and weeds preserved and plowed under. Separate enclosures for the livestock were to be maintained where they could be fed and the dung collected.³⁷ This system made little headway, however. Attempts to maintain artificial meadows and experiment with introduced pasture grasses were rather widespread but had little effect on the over-all system of farming. Such attempts were most successful near the larger towns or in the districts near the mountains.³⁸

Agricultural Decline, 1820-1840

The clearing of new land, cultivation until the virgin fertility was depleted or until sheet washing and gullying had partially destroyed the land, abandonment, and emigration, were normal processes in the agriculture of the cotton region, even more than in that part of the Piedmont to the north. Individual

37. Davie, loc. cit., pp. 218-220; Millhouse, loc. cit., pp. 121-124; Charles Fisher, "An Address to the Rowan Agricultural Society," Amer. Farmer, 1st ser., v. 3 (Aug. 24, 1821), pp. 169-171.

38. See for instance; Drayton, op. cit., pp. 142-143; Anon., "What Grass Can be Substituted in Georgia for Red Clover?" by N. C., Amer. Farmer, 1st ser., v. 3 (May 11, 1821), p. 52; Anon., "A Talk About the Resources of Georgia--Herd's Grass, Hay, etc." by Nancocchee, Sou. Cult., 1st ser., v. 8 (March 1850), p. 41; Herbert A. Keller, editor, Solon Robinson, Pioneer and Agriculturist, Indiana Historical Collection (Indianapolis, 1936), v. 2, p. 358; Anon., "Clover at the South," by H., Sou. Cult., 1st ser., v. 18 (Jan. 1860), p. 21; Patent Office Reports, Agri., 1851, pp. 315, 320; 1853, p. 220.

larger towns or in the districts near the mountains.

Agribusiness, 1980-1985

The clearing of new land, cultivation until the virgin forest was depleted or until sheet washing and gullying had rendered the land unproductive, and the consequent loss of the soil, were the main causes of the agricultural depression in the cotton region, even in the early years of the century.

W. Davis, 200, 11th St., N.W., Washington, D.C. 600-1117
J. H. Davis, 200, 11th St., N.W., Washington, D.C. 600-1117
J. H. Davis, 200, 11th St., N.W., Washington, D.C. 600-1117

For the information of the Bureau, it is noted that the above-named individuals are all persons who have been convicted of crimes involving moral turpitude and are therefore inadmissible to the United States under the provisions of the Immigration and Naturalization Act.

The following information was obtained from the records of the Department of Justice:

J. H. Davis, 200, 11th St., N.W., Washington, D.C. 600-1117
J. H. Davis, 200, 11th St., N.W., Washington, D.C. 600-1117
J. H. Davis, 200, 11th St., N.W., Washington, D.C. 600-1117

The above information was obtained from the records of the Department of Justice.

fields, farms, plantations, and, to a lesser degree, entire counties and the region as a whole went through this cycle. Habits of waste and restlessness built up in the pioneer period were carried over into the time of cotton cultivation and influenced the farming of the region even after the frontier itself had passed on to the west and southwest. Fresh land in the southwest, even though at a greater distance than in the eighteenth century, still served as a powerful magnet for the population of the older states, and the existence of fresh land was an underlying cause for the poor methods of tillage, failure to adopt conservation practices, and readiness to ~~emigrate~~^e. Contemporaries realized this and understood that so long as the opportunity existed for migration to fresh western lands there would be little inducement for the farmers to improve the old lands in the east. As one planter interested in agricultural reform wrote:

... the man who feels that spirit [of ~~emigration~~^e], cares but little for the future condition of the country, where he considers himself but temporarily located. To him the governing object is to "skim the cream".³⁹

This pioneer attitude caused planters to give greater weight to secondary reasons for ~~emigrating~~^e--reasons which might not have been operative in an economy with a smaller surplus of resources. The wearing out of the land, itself a result of wasteful methods, was given as one reason for ~~emigrating~~^e. The increase of the

39. William Ellison, "On Horizontal Ploughing," Sou. Agri. (Charleston), 1st ser., v. 3 (April 1830), pp. 178-182; See also C. C. Pinckney, "Effects of Immigration and Remedies," Sou. Agri. (Charleston), 1st ser., v. 9 (March 1836), pp. 130-132.

planter's family and the necessity for providing a better living for the younger members was also given as a cause. In the early years of the nineteenth century epidemics in the South Carolina Piedmont served to swell the stream of migrants, and the supposed unhealthfulness of a locality was at other times given as a reason for leaving. Drought and crop failure occasionally contributed to ~~the~~ migration. The great drought of 1845 was said to have caused a movement en masse from some districts in South Carolina, Spartanburg District alone losing 2,000 persons by the beginning of 1846.⁴⁰ Some whole communities removed to the territory northwest of the Ohio River in the early decades of the nineteenth century because of their opposition to slavery and the increase in the plantation-slavery system.⁴¹

Low prices doubtless had some influence on immigration, but the influence was perhaps as much negative as positive. The great wave of migration in the 1830's, for instance, occurred at a time of relative prosperity. During the depression of the 1840's the number leaving the Piedmont was considerably reduced, perhaps because planters had no excess funds to spend for the journey or to purchase western lands. (See Appendix No. II, Table No. 5.)

The advent of commercial cotton raising caused an intensification in the clearing and cultivation of land, without bringing any

⁴⁰ Mills, op. cit., p. 527; Mendenhall, op. cit., chap. 5; Anon., "Effects of Drought in South Carolina," Massachusetts Ploughman, v. 5 (Jan. 3, 1846), p. 3.

⁴¹ John Belton O'Neill and John A. Chapman, The Annals of Newberry, in Two Parts. (Newberry, S. C.), 1892, pp. 34-35, 329-333.

corresponding adoption of conservative methods of farming.⁴² The small farmer employing only the labor of himself and his family was in part displaced by the plantation owner employing gangs of slaves, and the plantation owner could clear--and thus deplete--land at a more rapid rate than his predecessor. Methods of cultivating and picking cotton were adopted that increased the amount of land tended by one hand from about 4 acres in the beginning to about 8 or 10 acres by 1840,⁴³ but this only made the individual operative a more efficient destroyer of land.

Emigration from the Cotton Plantation Area was greater in proportion to immigration and natural increase of the population than from the Cotton Farming Area. The small farmer who was not able to become a slave-owning planter in the early years of cotton prosperity moved westward out of the Plantation Area. Later, when competition from the fresh cotton lands of the southwest became serious, many of the larger planters themselves moved, taking their slaves with them. In many counties, the time arrived when the increase in negroes no longer offset the drain on the white population, and the total population began to decline. The total rural population of the Cotton Plantation Area increased from 105,912 in 1790 to 439,780 in 1860, more than a three-fold growth. In the Cotton Farming Area the increase was from 88,394 to 493,370, or more than a four-fold growth in this same period.

42. William R. Davie, loc. cit., pp. 218-220.

43. Stine and Baker, op. cit., p. 21.

Part of the greater increase in the Cotton Farming Area was due to the fact that more land was opened to settlement in the Georgia part of this area than in the Plantation Area, and to slight contractions in the Plantation Area due to changes in county boundaries. However, even in South Carolina the increase in population in the Plantation Area was 181 percent as compared with 231 percent in the Cotton Farming Area between 1790-1860. (Compare the population growth and trends in growth as shown on Maps 3 and 4 in Appendix No. III.)

The effect of the cycle from settlement to abandonment on numerous individual farms in a given locality was cumulative. Settlement in any one neighborhood was spread out over a number of years. The farmsteads were dotted rather sparsely over the area at first, but gradually became more numerous until they almost filled the landscape. An example of this is cited in footnote 51 on page 206. The first farm settled may thus have reached an advanced stage in the process of clearing and "wearing out" by the time the last farms were established. The same thing applied to fields within a farm. A farmer cleared a field, cultivated it until it would no longer bear crops profitably, then abandoned it. In the course of a few years weeds, broom sedge, shrubs, and finally pines covered the abandoned field. In the meantime the farmer had cleared several other fields at different times and started them on the cycle. At any one time, therefore, a farm consisted of several fields in various stages, some newly cleared, some in intensive cultivation, some abandoned and covered with grass and bushes, and some supporting pines of various age. The

farm's reserve for future use consisted of its acreage of virgin hardwood timber. Since this reserve was generally used at a more rapid rate than nature's recuperative processes could work on the old fields, the time was eventually reached when the entire plantation was considered "worn out" and the owner sold out and moved elsewhere. A great many farmers did not wait until this stage had been reached, but heeded the call of fresh lands in the west long before the last stand of virgin timber had been cut. By this time the farm's value was determined in considerable measure by the acreage of remaining virgin timber plus the acreage of sizeable pine. Farms were often sold for the value of the timber, the cleared fields and buildings being thrown into the bargain for nothing.⁴⁴ In that day of rail fences and open range for livestock the timber land represented a necessary source of fencing and building material as well as a shelter for the soil.

This system caused the face of the land to become a patchwork, or, as one writer declared, "our country has been pretty in spots, and left in all states of fertility that you can conceive."⁴⁵ As the land was filled with settlements, and especially as the introduction of cotton cultivation accelerated the pace of clearing and cultivation, the effects of soil erosion became noticeable on a regional basis. The speed with which this took place was different in different areas. For one area Sir Charles Lyell, the

⁴⁴Garnett Andrews, loc. cit., pp. 117-119.

⁴⁵Patent Office Reports, Agri., 1847, p. 386.

British geologist, has left us a possible measure of the time required for the cumulative results of clearing and cultivation to become noticeable in soil loss. While crossing the Altamaha River in Georgia he was informed that as late as 1841 the eastern affluent of this stream, the Oconee, sent down a copious amount of red muddy water when in flood, whereas water from the western affluent, the Ocmulgee, was clear even in time of freshets. This was because the lands on the Oconee had been partially cultivated. After this date, however, clearing and cultivation in the Ocmulgee watershed had caused that stream to become discolored.⁴⁶ Most of the lands on the eastern side of the Ocmulgee River were opened to settlement in the period 1803-1807, and those on the western side and near the headwaters, constituting the major portion of the watershed, were opened in 1821. Thus, 38 years elapsed from the date of the first opening to the date when the river first began to be discolored during flood, but it was only 20 years from the time when most of the lands were opened to the date of first discoloration. We may assume that this was the time that elapsed before soil erosion had become sufficiently widespread to cause the river to carry a noticeable silt load.

In the cotton belt of the Carolinas the cycle from first settlement to the beginning of cotton cultivation, and then large-scale depletion and abandonment for the area as a whole was

⁴⁶ Charles Lyell, A Second Visit to the United States of North America (London, 1849), v. 2, p. 23.

comparatively long. The first settlements were made about 1740, but only one of the counties reached the peak of its antebellum population growth before 1860. (See Appendix No. III, Map No. 3.) Several counties experienced a decline in population before that date, followed by later renewed growth. In most of the Plantation Area of South Carolina the emigration of whites was offset by the increase in the number of slaves. Georgia, however, presents an interesting case study in the operation of the cycle, for the period from settlement to the beginning of large-scale cotton culture and then to large-scale abandonment and emigration was much shorter than in the Carolinas. The tempo of the cycle was considerably accelerated in that part of Georgia west of the Oconee and Apalachee Rivers. Whereas about 55 years elapsed from the beginning of settlement in the South Carolina Piedmont to the beginning of commercial cotton cultivation, in the Georgia lands opened by lottery the cotton planter crowded closely upon the heels of pioneer settler, if, indeed, the two were not combined in one and the same person.

The counties of Baldwin, Jasper, Jones, Morgan, and Putnam, lying west of the Oconee and Apalachee, were opened by lottery in 1803 and 1806. The slave-owning cotton planters had begun to displace the small farmers by 1820, and in that year the white population reached the peak of its antebellum growth. The proportion of colored population increased with each succeeding census, reaching more than half of the total in 1830, but even the colored population reached the peak of its absolute growth by 1850. Moreover, the increase in colored population was not sufficient in the

...the ... of the ... reached the peak of its ... (See Appendix No. III, ... N.) ... experienced a decline in population ... by later renewed growth. In ... of the ... the ... of the ... the number of slaves. Georgia, however, ... an interesting case study in the operation of the ... the ... to the beginning of large-scale cotton ... in the ... the ... of the ... in the ... about 25 years ... the ... in the ... the ... of cotton cultivation, in the ... the cotton planters crowded closely upon the ... the two were not ... the same reason. The ... of ... , ... , and ... , were opened by ... in the ... and The slave-owning cotton planters had begun to dis- ... in 1820, and in that year the white popu- ... with ... in 1820, but even the colored ... the peak of its absolute growth by 1820. These ... in colored population was not ... in the

long run to make up for the loss of whites, for the total population was greatest in 1820, and the total population in 1860 was only slightly larger than in 1810, at the time of the first census for these counties. (See Table No. 6.)

Table No. 6
Population Data: Baldwin, Jasper, Jones,
Morgan, and Putnam Counties, Georgia

| Census year | <u>1810</u> | <u>1820</u> | <u>1830</u> | <u>1840</u> | <u>1850</u> | <u>1860</u> |
|------------------|-------------|---------------|-------------|-------------|---------------|-------------|
| Total Population | 40,927 | <u>67,913</u> | 59,078 | 47,807 | 53,396 | 49,050 |
| White | 27,824 | <u>37,864</u> | 26,689 | 19,615 | 18,673 | 16,851 |
| Colored | 13,103 | 30,049 | 32,389 | 28,192 | <u>32,723</u> | 32,199 |
| Percent colored | 32 | 44 | 55 | 59 | 64 | 66 |

Note: Greatest number in each category is underscored.

The migration from these five counties was accompanied by complaints of worn out soil and hard times. In 1828 a committee was appointed in Putnam county to inquire into the causes and possible remedies for the existing "embarrassments in the community." It listed as the reasons for the depressed condition, "the reduced prices of produce; the exhaustion of our lands; bad crop years; bad management; extravagance; and purchasing on credit." Elaborating, the committee declared that "our fields are deprived of much of their original fertility," and decried the habit of planters of buying pork, horses, mules, and corn, when these could be raised, and the hiring of overseers when the planters themselves

should attend to the business. A program of retrenchment and greater self-sufficiency was suggested.⁴⁷ In 1833 a resident of Monticello, Jasper county, wrote to his brother in Michigan:

This part of the Country is getting to look very old & that is not all--it is like the balance of the Southern Country, it is getting very poor--our lands are waring [sic] out--everything looks like going to decay. What a contrast between Geo. and Michigan--there the older your Country, the more it is improved & the thicker it becomes settled--here every thing operates on the reverse-- This county has but half as many inhabitants as when you were here.⁴⁸

Not quite two decades after this letter was written, another observer gave a short review of the land use history of the five counties. He wrote:

Forty years ago, these counties were nearly all in the woods. The few plantations that were then opened were small and all fresh, but the country in a very few years became thickly settled in some cases, four or five settlements on one section of land. The result is that the lands are worn out, and perhaps more completely exhausted than any other part of the United States that I have seen. The lands have now fallen into the hands of comparatively few, some men owning from two to five thousand acres.

This writer went on to estimate that about one-third of the lands at that time (1850) were in woods, about one-third suitable for cropping, being either fresh lands or improvable by manuring, and about one-third "so much worn that it will not pay a man for his labor."⁴⁹

47. William Turner et al, "Agricultural Distress," Amer. Farmer, 1st ser., v. 10 (April 18, 1828), pp. 34-36.

48. H. Cooley to D. Cooley, Monticello, Ga., June 2, 1833, Dennis Cooley Letters, MSS, Duke University Library.

49. John Farrar, "Farming in Middle Georgia," Sou. Cult., 1st ser., v. 8 (Dec. 1850), pp. 179-180.

Testimony of John J. O'Connell, Sheriff of Cook County, who testified that he had no record of a person named [redacted] in Cook County, Illinois, who had been arrested or convicted of a crime.

the country is getting to look very old & that is

But within two decades after this letter was written, another

[illegible]

at that time (1890) were in woods, about one-third suitable for
agriculture, being either fresh lands or improvable by manuring, and
about one-third "so much worn that it will not pay a man to till
it."

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY

J. H. Gooch & S. W. Gooch
Geological Survey, U.S. Department of the Interior

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Thus, only about 25 years after the district was opened to settlement there were complaints that the land was depleted of its virgin fertility, the point of maximum antebellum population growth had been passed, and large-scale emigration, especially of the white population, had set in. At about the same time the plantation-slavery system had become dominant in these counties as they became part of the "black belt," more than 50 percent of their population being colored. By 1850, about 37 years after the first settlement, approximately one-third of the land had been seriously damaged by erosion or other forms of depletion, according to the informed guess of one observer. The inroads of soil erosion in this general area is also attested by Sir Charles Lyell. In 1846 he wrote his classic description of the gully near Milledgeville. Twenty years previously, he said, it had not existed, but at the date of writing it had grown to a chasm about 55 feet deep, 300 yards long, and from 20 to 180 feet in width.⁵⁰

Harris county, on the western edge of the Georgia Cotton Plantation Area, offers another example of the settlement-abandonment cycle.⁵¹ Population data for this county are given in

50. Lyell, op. cit., v. 2, p. 23.

51. It seems that in areas subject to lottery a number of years elapsed before all the lots in any one neighborhood were actually settled, just as had been the case in areas where land was distributed by headright. In land districts Numbers 20 and 21 of the original Muscogee county, later Harris county, there were 679 lots and fractions of lots, containing a total of 134,789.9 acres. The lottery for this area was held in 1827. The tax digest of Harris county for 1831 reveals that only approximately 209 of these lots had passed into private hands and that the total

Table No. 4. The county was opened by lottery in 1827, and by 1851 the complaint was expressed that "the fields that once brought large and remunerative crops, many of them, are reduced to sedge grass, all scarcified [sic] with gulleys."⁵²

The effects of the rapid opening of new land on the flow of ~~the~~^e migration is evident in the population statistics of the entire Piedmont, and was recorded by contemporaries. Thus, the Irish traveller Tyrone Power observed in the mid-1830's:

The rich alluvial lands of Alabama, recently belonging to the Indian reserves, and now on sale by government or through land-speculators, are attracting thousands of families from the washed-out and impoverished soil of the older Southern States; and during this and the preceding season, the numbers moving along this and the other great lines [through Georgia] towards the Southwest are incredible, when viewed in reference to the amount of population given to the countries whence the emigrants are chiefly derived.⁵³

In Georgia the effects were even more marked than farther north, since in the 1820's and 1830's Georgia was nearer to the areas opened. Nearly half of the Georgia Piedmont was settled in the period 1820-1840, and in addition large bodies of land were made available in southwestern and northwestern Georgia and in Alabama and Mississippi by the removal of the Cherokees,

land returned for taxes by the owners of these lots was only 54,124 acres. It appears, however, that most of the land was taken up by 1845. (Information on number and acreage of lots furnished through courtesy of office of Secretary of State, Atlanta, Georgia.)

52. J. H. Williams, "Renovating Southern Lands," The Plough, the Loom and the Anvil, v. 4 (Dec. 1851), pp. 360-361.

53. Tyrone Power, Impressions of America, 1833, 1834, 1835 (Philadelphia, 1836), v. 2, p. 80.

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Creeks, Chickasaws, and Choctaws. The parts of the state east of the Oconee and Apalachee suffered a decline in population in the decade 1830-1840. In the case of the plantation portions of this region the decline continued to 1850. The five plantation counties between the Oconee and the Ocmulgee Rivers opened in 1803 and 1806 lay nearer to these newer lands and felt the effects of their opening even sooner than eastern Georgia. There was a decline in population amounting to about 30 percent in these counties between 1820 and 1840.

In western Georgia from the first settlement to 1860, as in the Carolinas and Virginia in colonial times, the abundance of land was conducive to short tenure, speculation, absentee ownership, and tenancy. Citizens in the older parts of the state who won lots in the Indian lands often sent others out to work the land on shares. The sending of agents to buy up the land of lucky participants in lotteries was also a common practice. The land thus secured might be held for an advance in price, or let out to tenants permanently or until such time as the owner could settle on it himself. Younger members of a family were also sent to exploit lots won or purchased. A prospective settler often found little difficulty in buying a homestead from a lot winner who had made a few elementary improvements but had become dissatisfied and wished to move on.⁵⁴

⁵⁴.These operations are well described in the correspondence in the George W. West Collection, MSS, Duke University Library. See also Joseph L. Lowrance to Samuel Guy, Newton County, Ga., Sept. 10, 1824, George F. Davidson Papers, Duke University Library.

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Attention has been focused so far on the Plantation Area because greater emigration and abandonment was experienced here than in the Cotton Farming Area. Although the migration from the Cotton Farming Area was, on the whole, more than balanced by accessions from adjoining areas and natural increase, the number of persons leaving was nevertheless considerable throughout the antebellum period. The soil was exploited less intensively for the fleecy staple than in the lower part of the Piedmont, but it was cultivated in corn, wheat, and oats with little benefit of manure, or was overgrazed, until much of the land became gullied and was abandoned to sassafras bushes, broom sedge, and pine. The complaint was often voiced that farmers attempted to till too much land.⁵⁵

Partial Recovery (ca. 1840-1860)

Attempts at greater self-sufficiency, improved cropping practices, and the search for alternative enterprises, both agricultural and industrial, to supplement the one-crop cotton economy were the logical reactions to the challenge of western competition, emigration, and destructive agriculture. Under extensive methods of culture, the soils of the Piedmont, either because of their "natural" infertility, their susceptibility to erosion, or

⁵⁵.Anon., "Letter on the Importance of Agricultural Schools and Agricultural Conventions, with Remarks by the Editor," Sou. Agri. (Charleston), 1st ser., v. 12 (June 1839), pp. 296-298; Patent Office Reports. Agri., 1851, p. 315.

The complaint was often voiced that farmers attempted to sell too much of their produce at once, and that they were forced to sell at low prices. The Government had been accused of forcing them to do so, and of taking advantage of their position.

...of culture, the soils of the Piedmont, either because of their infertility, their unsuitability to erosion,

their worn condition, were not able to compete successfully for the available supply of slave labor with the level, fresh lands of the Alabama-Mississippi black belt or the Mississippi delta. Piedmont planters were accordingly forced to assist nature by adopting more intensive cultural methods with such resources of labor as they had. The fact that cotton culture was already a "going concern" in the plantation Piedmont and had built up a considerable reserve of capital before it became established in the newer regions was favorable to the Piedmont. This reserve was used to buy up the land of the immigrants and build railroads to reduce the cost of transporting goods to market, as well as to inaugurate improved farming practices. The railroads and the new fertilizing methods, in turn, enabled cotton culture to be undertaken on new lands in the Piedmont itself which had not formerly been open to it. The better prices for cotton in the 1850's than in the 1840's also made improvement more profitable.

— Agricultural societies and agricultural magazines were the principal agencies of reform in farming practices. At first the movement was influenced by the more cosmopolitan low country. The Pendleton Farmers' Society, the first organization in the South Carolina Piedmont, formed in 1815, was made up largely of farmers and planters originally from the low country in close contact with the members of the Agricultural Society of South Carolina of Charleston. In the late 1830's several more local societies were founded, and by 1841 there were eight of them in the South Carolina Piedmont. Of the several local societies founded in the North Carolina cotton Piedmont, the Rowan Agricultural Society,

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formed in 1821 or earlier, was perhaps the first. In Georgia the Hancock Planter's Club, founded in 1831, exerted a wide influence.⁵⁶ Several short-lived state agricultural societies were established at Columbia, South Carolina (not to be confused with the Charleston organization). The South Central Agricultural Society of Macon was organized in 1846 and became an important regional organization for central Georgia.

The Southern Agriculturist, published at Charleston between 1828 and 1845, was perhaps the first representative of the agricultural press in South Carolina and Georgia. The Southern Cultivator, founded at Augusta, Georgia, in 1841, survived the Civil War and was the most important agricultural periodical in the region. Another journal of wide influence was the Farmer and Planter of Pendleton, later Columbia, South Carolina, published in the period 1850-1861. There were several other periodicals issued for varying periods in the two states, and in addition, the Columbus, Georgia Soil of the South and the Montgomery, Alabama American Cotton Planter, after existing separately, were merged into one periodical serving the cotton belt.⁵⁷

56. James C. Bonner, "Genesis of Agricultural Reform in the Cotton Belt," Jour. Sou. Hist., v. 9 (Nov. 1943), pp. 475-500. Bonner correctly points out the high achievement and reputation of the Hancock club, but his statement that an agricultural reform movement largely indigenous to the cotton belt appears to have had its origin in Hancock Co. seems unjustified to the present writer. The movement in South Carolina, at least, seems to have flourished with the benefit of only incidental reference to the Hancock club.

57. A. R. Hall, op. cit., p. 5; Bonner, loc. cit.

Like Virginia and North Carolina, South Carolina employed agricultural and geological surveyors. An appropriation for a two-year period for this purpose was secured in 1842, with the support of several of the agricultural societies. Edmund Ruffin was secured as the first surveyor for South Carolina. The work was carried forward later by Michael Tuomey. In the 1850's Oscar M. Lieber was appointed and prepared a series of four annual reports, more detailed than those of his two predecessors.⁵⁸ Tuomey and Lieber prepared the first systematic accounts of the geology and soils of the state as a whole, and their discussions of vegetation were also valuable. Ruffin was concerned primarily with possible sources of calcareous manures and inquiries into the best agricultural practices. These surveys had been instituted amid warnings that knowledge of the rocks of the state were of little value to the ordinary farmer, and that most farmers were as yet so ignorant of the principles of science that they could not utilize the facts ascertained by the surveyors. It was suggested that if maximum benefit were to be derived from the surveys by the mass of South Carolina farmers and planters, agricultural societies and the agricultural press should be greatly expanded and a system of agricultural schools put in operation.⁵⁹

58. Edmund Ruffin, Report on the Commencement and Progress of the Agricultural Survey of South Carolina, for 1843 (Columbia, S. C., 1843); Michael Tuomey, Report on the Geology of South Carolina (Columbia, S. C., 1848); Oscar M. Lieber, Report on the Survey of South Carolina (Columbia, 1860).

59. John Bachman, Agricultural Addresses (Charleston, 1841), pp. 12-31; South Carolina General Assembly, Reports and Resolutions of the General Assembly of South Carolina, Passed at Its

In Georgia the suggestion of public education in agriculture was put into practice on a limited scale. William Terrell of Hancock county endowed Franklin College at Athens with \$20,000 for the maintenance of an agricultural professorship. An annual course of lectures was to be delivered free to students and others. Dr. Daniel Lee, editor of the Southern Cultivator, held the post for eight years, from its establishment until 1862.⁶⁰ C. P. B. Martin organized a successful farm school near Griffin in 1857.⁶¹

The reform movement was carried forward by a comparatively small group of planters and professional men. Through the agencies of the fairs held by the local societies and the agricultural magazines a somewhat larger group of farmers was reached indirectly. The majority of the farmers, however, received little permanent benefit. During the period of low cotton prices in the 1840's there was more self-sufficiency on the farm, but with higher cotton prices in the 1850's farmers began to discard their subsidiary enterprises and to concentrate once more on cotton. There appears to have been a decline in the per capita production of most grain crops between 1839 and 1859, but an increase in per

Regular Session of 1842 (Columbia, 1843), pp. 88-92; R. W. Gibbes, "The Agricultural Convention," Sou. Agri. (Charleston), 1st ser., v. 12 (Dec. 1839), pp. 627-645.

60. Anon., "Agricultural Professorship," Sou. Cult., 1st ser., v. 12 (Oct. 1854), p. 315; True, Hist. of Agri. Education in the U.S., p. 71.

61. Bonner, loc. cit.

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regard to the South in the 1880's farmers began to become more
economically self-sufficient and to produce more of their own
needs. There appears to have been a decline in the per capita production
of most grain crops between 1875 and 1885, but an increase in the

Georgia Journal of 1882 (1882-1883), pp. 1-2.
"The Agricultural Convention" (Charleston), 1st ser.,
p. 12 (Nov. 1882), pp. 1-2.
"The Agricultural Convention" (Charleston), 1st ser.,
p. 12 (Nov. 1882), pp. 1-2.

capita production of cotton. (See Appendix No. IV.) The greatest amount of general farming and home industries in connection with cotton production seems to have taken place approximately during the decade 1840-1850.⁶² In the next decade cotton culture became more commercialized.

In respect to self-sufficiency, the success of the reform movement was thus dependent on the state of the market. In respect to better cropping practices and soil conservation the advances were limited but real, as indicated in the second and third sections of this chapter. The use of contour plowing and hillside ditching in an attempt to check erosion became rather widespread. (See Chapter VII.) In the counties and districts of the Cotton Farming Area the profits from increasing cotton cultivation and to some extent the influence of agricultural societies brought a change from a more primitive type of farming to one involving improvement in crops, livestock, and the general appearance of the farms in the decade before the Civil War.⁶³

62.Gray, op. cit., v. 2, p. 686; James C. Bonner, "Agricultural Adjustment in Ante Bellum Georgia," in Studies in Georgia History and Government (Athens, Ga., 1940), pp. 149-153; South Carolina: a Handbook (Columbia, 1927), pp. 95-195.

63.Eighth Census, 1860, Agriculture, Spartanburg District, S.C., comments by the enumerator attached to the schedule, MSS, South Carolina State Library, Columbia; Anon., "A Word for Spartanburg," The Spartan (Spartanburg, S. C.), May 1, 1851, p. 2.

Chapter VI

THE COTTON AREA, 1860-1930

Summary

Although the property destruction resulting directly from the Civil War was great, the agriculture of the cotton Piedmont was more permanently injured from other causes. Soil depletion during the war was great because of the necessity for making of crops without fertilizer and under inexperienced management. For a time there was demoralization as a result of the freeing of the slaves and the establishment of the tenant system of labor. Share cropping, share tenancy, and the system of securing credit through crop liens and mortgages given to the local supply merchants were established because the farmers were too impoverished after the war to operate successfully on a cash basis. The region was later held in the grip of these systems in part because the low price of cotton during the last three decades of the century prevented any accumulation of profit by most farmers. Both tenants

THE COTTON AGE, 1850-1860

Summary

Although the property interests involved in the
slave and the growth of the cotton industry
were necessarily linked from the start, the
link was not great because of the necessity for making of
large capital facilities and other important elements. The
slave system was demoralization as a result of the freedom of the
slave and the establishment of the tenant system of labor. These
changes, which brought, not only a change of working conditions
but also a change of the social system as the slave system was
established. The former was the organized slave
and in general, the latter was a new order. The system was
based on the fact that the slave system was not a new order
of labor during the last years of the century. The system
was a demoralization of the slave system. The system

and farm owners were required to make cotton to secure cash to repay the merchants, who in turn furnished supplies and fertilizers to the farmers. The old system of mixed cotton and grain production was thus now replaced by a more strictly cash crop economy.

The Cotton Plantation Area was most affected by this change. Many farms came into the possession of the merchants through foreclosure or sale, and the merchants controlled operations on much other land through credits and advances. The farm owner's control of his land was thus weakened, on the one hand because it was in the hands of tenants, and on the other because the merchant required cotton in payment for his advances. Immigration from the worn lands was great immediately after the war, and it continued. Much land was abandoned during the 1880's and 1890's. In the Cotton Farming Area the transition from slave to free labor did not cause so great a strain on the economy as in the Cotton Plantation Area. The new systems of labor and credit did not work so great a hardship in the farming as in the plantation areas because there were more medium-sized general farms and the number of slaves on each farm had been small. Expansion of cotton cultivation here created prosperity for a time during the 1880's.

The opening of phosphate beds on the South Carolina coast and development of "complete" mixtures made available new fertilizers for cotton production. In the Cotton Farming Area the crop could be produced farther north and toward the mountains than had previously been possible. The opening of certain coarse sandy lands

and these women were required to leave their homes in
order to be employed, who in turn furnished supplies and food-
stuffs to the Government. The use of women in this manner was
very common and was now replaced by a more efficient one.

The Cotton Plantation Area was most affected by this change. Many farms came into the possession of the merchants through fore- closure on sale, and the merchants controlled operations on great plantations through credits and advances. The fact of the cotton- planters' dependence on the merchants was the cause of the great loss of the cotton planters in the hands of the merchants, and on the other because the mer- chants required cotton in payment for his advances. In the transition from slave to free labor the cotton planters were great immediately after the war, and it was abandoned during the 1850's and 1860's.

[illegible]

The opening of phosphate beds on the North Carolina coast and

in the Plantation Area also occurred through the use of fertilizer, but the clay loams, stream bottoms, and other types of land that had been utilized in slavery times could not be profitably cultivated now. Throughout the Piedmont, the uplands increased in relative importance while the lowlands declined, partly as a result of the use of fertilizer and partly because cumulative washing from uplands choked stream channels and increased the problem of drainage and floods in the lowlands.

Fertilizer was used on cotton almost universally. Its use on grain crops varied from place to place. The repeal of the old fence laws and the requirement that livestock should be fenced in was beneficial to both stock and land. Hay crops increased gradually. Some few livestock farms and subsidiary enterprises to cotton were developed during the period 1870-1900. After 1900 cotton production became more profitable for land owners who were already established. There was a slight improvement even in the condition of the tenants.

The good times of the early twentieth century culminated in the war boom of 1915-1919. The sudden ending of the boom in the following year left widespread bankruptcy and distress, and this was compounded by the invasion of the boll weevil about the same time. Cotton crops were reduced more than one half in Georgia during 1920-24 from the previous five-year period. The complete abandonment of large sections of the Plantation Area dates from this period. Former tenants and croppers found jobs in northern cities. In a desperate attempt to make a living, farmers turned to saw milling, using the timber that had been growing on

abandoned fields since the 1880's. The making of cotton crops under boll weevil conditions soon revived somewhat, but the crops were never as large as in the earlier decades. More varied farm enterprises were now established. Peach and pecan orchards became profitable in some sections. Large scale peanut raising was tried unsuccessfully. The sale of vegetables, milk, and poultry to the larger towns and cities became established on a limited scale and in favored localities. Since the depression of the 1930's the production of cotton has been cut down again, and a larger proportion of the land is used for leguminous crops, pasture, and hay.

Post-Civil War Readjustments in Agriculture

The increasing commercialization of cotton culture in the decade 1850-1860 was halted abruptly by the Civil War. During the war northern and foreign cotton markets were cut off, and sources of fertilizer outside the region were not accessible. Although cotton continued to be produced, patriotism and immediate necessity dictated the raising of a much larger proportion of provision crops than before. Farms continued to operate in the face of a shortage of experienced managers, inability to secure guano and other commercial manures, a lack of cotton seed fertilizer for the grain crops, and deteriorated seed for planting. Although in many instances the area devoted to corn and small grains increased, the product diminished. Planting and cultivating

were done hastily and inefficiently, fields became depleted of fertility, fencing and hillside ditching were neglected, and cattle received even less care than was customary.¹ In the last year of the war the great invasion of northern troops destroyed farm property and stores of cotton and provisions, but it is probable that the permanent damage to agriculture in the Piedmont caused by this spectacular event was not great when compared with the attrition of soil resources during the preceding war years and the demoralization that accompanied emancipation and readjustment to the new system of labor.

When the slaves were freed the land owners of the Piedmont found themselves in competition with each other and with planters of other sections of the cotton belt for the labor of their former charges. It was generally believed among the planters that the maintenance of the plantation system, with only the substitution of hired hands for slaves, would be the most efficient and profitable procedure for all concerned. Attempts were made to establish this system immediately after the war, but after about three years' trial it was generally abandoned. The failure of the wages system was attributable to several causes. The high price for cotton after the war made farmers eager to return to cotton planting as soon as possible. There was keen competition for freedmen laborers, not only in the Piedmont Plantation Area,

1.D. Wyatt Aiken, "Cotton vs. Corn," Fairfield Herald (Winnsboro, S. C.), April 10, 1867, p. 4; Turner W. Holly Papers, MSS, Duke University Library.

but throughout the cotton belt. Piedmont cotton planters found themselves handicapped, as in antebellum days, in competing with the west for labor. In 1867 the average yearly wage for men field hands in Louisiana and Mississippi was \$150 and \$149 respectively, whereas in South Carolina and Georgia it was \$100 and \$125.² It was estimated that between 1865 and 1868 over 139,000 Georgia negroes moved west, and on one day in 1866 some 200 passed through the one small town of Winnsboro, South Carolina bound for Mississippi.³ Competition was also keen between individual planters in the Piedmont, and with those on newly opened cotton lands of the Coastal Plain.

The freedmen were thus able, within limits, to set their own price and conditions, and they preferred the apparent greater freedom of the tenant or share cropper to the status of the wage hand working under close supervision. Relatively few planters could afford large cash outlays for wages, and their financial position was still further weakened by the drought and short crop of 1866.⁴ Throughout most of the remainder of the century cotton prices were so low that any revival of the plantation system by the use of hired work gangs was impossible.

The systems of share cropping and renting were adopted in

2. U. S. Com. Agri., Report, 1867, p. 416.

3. The News (Winnsboro, S. C.), Dec. 13, 1866, p. 2; U. S. Com. Agri., Report, 1868, p. 573.

4. Robert Preston Brooks, The Agrarian Revolution in Georgia, 1865-1912, Bul. U. of Wisconsin, No. 639, History Series, v. 3, no. 3 (Madison, 1914), pp. 18-26.

the system of share cropping and renting was adopted in the South. The tenant farmer was responsible for the seed, the fertilizer, and the labor, and the landowner provided the land and the tools. The tenant farmer paid the landowner a share of the crop, usually one-third or one-half, and the landowner provided the land and the tools. The tenant farmer was responsible for the seed, the fertilizer, and the labor, and the landowner provided the land and the tools. The tenant farmer paid the landowner a share of the crop, usually one-third or one-half, and the landowner provided the land and the tools.

place of the wage system. The share cropper was a laborer who received his wages in kind at the end of the crop season rather than in cash, but he shared in the expenses for fertilizer and ginning the cotton, and in practice he often enjoyed less supervision than the wage hand. The renter furnished his own work stock and equipment and paid a portion of the crop as rent, or less commonly, a fixed cash rent. If the renter paid a fixed quantity of the product of the farm as rent, such as 2,000 pounds of cotton, he was termed a "standing renter." The standing renters and cash renters became the most independent of the non-land-owning portion of the farming community. This is only a general summary of the system of labor and tenure adopted. The details varied widely from plantation to plantation. One development common to the whole system, however, was the general weakening of the planter's control over the working of his lands. The more far-sighted of the planters and farmers felt that their interests were injured by the adoption of the system, but they were powerless to reverse the trend. Share cropping was more popular in the earlier years among the land owners because it was believed that the cropper's labor could be more easily controlled. Even on plantations where the work was closely supervised, however, there were complaints that a plan of improvement by rotation, deep plowing, and application of compost manure was impossible to carry out with cropper labor, that the cropper would not purchase sufficient fertilizer, would not repair fences, stop washes, or

place at the very first. The same subject was a laborer who
remained the night of the 1st of the month and
then in each, but he was in the position of the first and
dislike the others, and in general he was not very well
visited than the very first. The subject remained in the
stock and equipment and paid a portion of the crop as rent, or
less commonly, a third each year. If the subject was a black
person of the province of the first he was, and as a result
of course, he was found a "black" person. The remaining part
was and was never found in the hands of the first and
being portion of the first community. This is only a general
summary of the system of labor and land tenure. The details
varied widely from plantation to plantation. The details
varied in the same system, however, and the general character
of the system was found with the system of the first. The more
developed at the plantation and found that they were laborers
were found in the system of the system, but they were never
seen in system the first. When working the first was
the first years among the land owners because it was before
that the system's labor found in the first system. It was
no plantation where the first was found in the first system.
There were conditions that a kind of improvement of the first
and system, and explanation of the first system was possible in
many and with system found, that the system found in the first
system the first, and the system found, and system, and

clean out hillside ditches.⁵ Many farmers, after attempting to operate on the share-cropping system without success, turned in disgust to different forms of renting.⁶ The freedmen, on the other hand, were anxious to gain an economic freedom compatible with their newly won personal freedom. They strove to become renters, a step which appeared to be upward toward land ownership. Renting on shares or for a standing quantity of the crop thus gained at the expense of share cropping. After years of experience with renting, many planters felt that it was even worse than share cropping because it gave the planter even less control over his land. The renter generally remained on one place only one season, just as did the share cropper, and he had no more interest in the upkeep of the land. One planter of Baldwin County, Georgia, said that land left to the judgment of the negro renter "will go to the bowwows, or the Atlantic Ocean, in this hilly country."⁷

True as these indictments against the share cropper and renter may have been, they tell only part of the story; for the

5. David Dickson, op. cit., pp. 86-87; Anon., "Labor--Best Course for Farmers," by Farmer, Soil. Cult., 1st ser., v. 35 (Feb. 1877), pp. 50-51.

6. D. Wyatt Aiken, "Does Farming Pay in the South?" Rural Carolinian, v. 2 (March 1871), pp. 323-324; D. Wyatt Aiken, "Labor Contracts," Rural Carolinian, v. 3 (Dec. 1871), pp. 113-115; Iredell Jones, "Tenantry System," in Essays Read Before the South Carolina Agricultural and Mechanical Society, August 8, 9, 10, 1877 (Columbia, 1877), pp. 82-87.

7. Brooks, op. cit., p. 64; E. M. Banks, The Economics of Land Tenure in Georgia, Columbia U. Studies in History, Economics and Public Law, v. 23, no. 1 (New York, 1905), pp. 78-93.

entire agricultural system of the cotton belt in the formative years of the cropper-tenant method was conditioned by the prevailing low price of the staple, the relative unprofitableness of its production, and the difficulty of securing credit. From a New York average of 32 cents per pound in 1866, the market price of cotton declined to less than 15 cents by 1875, and remained below the latter figure throughout the remainder of the century. The average yearly price was less than 10 cents throughout the last decade.⁸ The general bankruptcy and demoralization of labor at the end of the war, together with the poor season of 1866, prevented planters from profiting by the high prices. By the time the new system of labor had become stabilized prices were dropping to a point where the margin of profit was very low or non-existent, both for the land owner and laborer. One Georgia farmer observed, regarding the year 1879, one of relative prosperity, "With cotton at 10 and 11 cents per pound, and the cost of production at from 8 to 9-1/2 cents per pound, the farmer about makes a living if he raises his own provisions, but lays up no money."⁹

8. Price data are from tables compiled by the U.S.D.A. Agricultural Marketing Service and Bureau of Agri. Economics, given in the annual volumes of Agricultural Statistics, as for instance, U.S.D.A., Agricultural Statistics, 1940 (Washington, 1940), pp. 108-109. A useful compilation of price data for the pre-Civil War period is Arthur Cole, Wholesale Commodity Prices in the United States, 1700-1861 (Cambridge, Mass., 1938).

9. Cotton Report, 1880, part 2, p. 441.

Local merchants stepped in to supply credit and furnish owners and laborers with supplies, taking as security liens on the growing crops or mortgages on the land and work stock. By 1881 fewer than one-fourth of the farms of South Carolina were free from liens, and between 1880 and 1890 the number of farm mortgages in Georgia increased from 3,353 to 10,242.¹⁰ Foreclosure of mortgages and forced sales of farms were numerous in 1866 and 1867 and continued high throughout the period thereafter. Large estates were broken up, and many small farms changed hands. Lands passed from antebellum owners into the hands of young farmers who were able to secure the necessary financial backing and into those of the supply merchants of the small towns. By the early 1900's about 15 percent of the land in Coweta County, Georgia was owned by merchants.¹¹ In addition, many farmers, unable to adjust themselves to the conditions of free labor, or discouraged by the prolonged hard times, sold out and sought employment in the growing towns of the region or in other states. As the agricultural depression deepened in the late 1880's and the 1890's this movement away from the farms continued, especially in the old plantation areas, with the result that many farms in these areas were left in the hands of managers or tenants, the owners residing in some nearby town.¹²

10.S. C. Commissioner of Agriculture, Second Annual Report, 1881 (Columbia, 1881), pp. 83-86; Banks, op. cit., pp. 50-52.

11.Banks, op. cit., pp. 46-52.

12.W. D. Potter, "A Note of Warning," Sou. Cult., v. 42 (Sept. 1884), p. 296; Anon., "Going Too?" News and Herald (Winnsboro,

Although much of the land came into the possession of non-resident proprietors, throughout the cotton Piedmont as a whole the number of proprietorships increased greatly between 1860 and 1900. The resident farmer, tilling his own land or giving more or less direct supervision to his croppers and share tenants was normal for the region.¹³ The evils of absenteeism did not at first arise by virtue of the town supply merchant owning broad acres and working them on shares. These evils came about, rather, because the resident farm owner, lacking liquid funds, was forced to let his land out to share croppers and share tenants, and because farm owner, tenant, and cropper, all alike depending upon the merchant for supplies, were forced to raise cotton to secure

S. C.), Dec. 29, 1883, p. 3; J. W. McWhorter, "Why Our Agricultural System is at a Standstill," Sou. Cult., v. 51 (June 1893), p. 300; Arthur F. Raper, Tenants of the Almighty (New York, 1943), pp. 111-112.

13. The following table shows the number and average size of farms, 1860, and the number and average size of proprietorships for later dates in selected Georgia counties. Data for 1860 from Census; data for later dates from tables in Banks, op. cit., pp. 131-134, compiled from county tax digests.

Cotton Plantation Area
(9 counties)

| <u>1860</u> | | <u>1873</u> | | <u>1890</u> | | <u>1902</u> | |
|-------------|----------|---------------------|----------|---------------------|----------|---------------------|----------|
| No. farms | Av. size | No. proprietorships | Av. size | No. proprietorships | Av. size | No. proprietorships | Av. size |
| 3,949 | 521 | 4,802 | 410 | 6,764 | 281 | 7,552 | 253 |

Cotton Farming Area
(6 counties)

| | | | | | | | |
|-------|-----|-------|-----|-------|-----|-------|-----|
| 3,117 | 310 | 4,518 | 226 | 5,774 | 181 | 6,244 | 166 |
|-------|-----|-------|-----|-------|-----|-------|-----|

Although much of the land was taken the possession of non-
 resident owners, the entire process was a result
 the number of non-resident landowners greatly increased. The
 land. The resident farmer, tilling his own land or giving some
 or less direct supervision to his cropers and share tenants was
 forced to the position of the tiller of the soil. The
 first step in the process of the town supply merchant owning broad
 acres and holding them in reserve. These were then sold, and
 because the resident farm owner, lacking funds, was forced
 to sell his land and to share it with the non-resident. The
 small farm owner, tenant, and croper all alike were forced
 the market for supplies, were forced to raise cotton to secure

U. S. Dept. of Agr. Bureau, Bureau of Plant Industry, Washington, D. C.
 Cotton Production in the United States, 1900-1910
 U. S. Dept. of Agr. Bureau, Bureau of Plant Industry, Washington, D. C.

The following table shows the number and average size of
 farms, 1900, and the number and average size of plantations,
 and other land in selected Georgia counties. Data for 1900 from
 Census data for later dates from tables in Census, 1910, 1920,
 1930, 1940, compiled from census and other sources.

| Cotton Farming Area
(in counties) | | | | | | | |
|--------------------------------------|-------------|-------------------------------|-------------|-------------------------------|-------------|-------------------------------|-------------|
| No. pro-
prietary
ships | Av.
size | No. pro-
prietary
ships | Av.
size | No. pro-
prietary
ships | Av.
size | No. pro-
prietary
ships | Av.
size |
| 1,302 | 251 | 4,302 | 410 | 6,764 | 281 | 7,522 | 223 |
| 2,211 | 310 | 4,212 | 226 | 5,774 | 181 | 6,222 | 122 |

cash to meet their debts. The supply merchant was in a position to bring strong pressure on any of his credit customers who wished to diversify and cut down on the principal cash producing crop.¹⁴

From the point of view of the tenant and cropper the incentives or even the possibility for practicing diversified farming and conserving the soil were small. With the onset of the agricultural depression the freedmen lost the favorable bargaining position that they had enjoyed at the end of the war.¹⁵ Having become croppers or tenants, they found themselves in most cases unable to accumulate the capital to become full owners. By 1903 only one farm owner out of 55 in Georgia was a negro and only one acre in every 25 of the improved land of the state was under negro ownership.¹⁶ The fact that an increasing number of whites drifted into the cropper or tenant status and stayed there suggests that economic conditions rather than any innate characteristics of the colored man, were responsible for this.¹⁷ Tenants, whether white or black, could not be expected to have an interest

14.H. Clarence Nixon, "The New South and the Old Crop," in Essays in Honor of William E. Dodd, edited by Avery Craven (Chicago, [1935]), p. 333; Anon., "The Condition of Fairfield," News and Herald (Winnsboro, S. C.), April 19, 1881, p. 2, and May 31, 1881, p. 2.

15.Anon., "The Question of Labor," by Cosmopolitan, Sou. Cult., 1st ser., v. 26 (Jan. 1868), pp. 12-13.

16.Banks, op. cit., pp. 70-76.

17.Vance, Human Geography of the South, p. 200.

in the land which they did not own, since they rarely lived on one place more than one year, and even if they were less mobile, they were obliged to overwork the land in cotton culture in an attempt to meet the obligations of the landlord and merchant.¹⁸ Unable to improve their living standards, thousands of the laborers, like the owners, yearly abandoned the Piedmont lands for lands in other regions or for work in the cities.¹⁹

The gloom which settled on the farming class of the plantation Piedmont after successive years of mounting debts, bankruptcies, and immigration was expressed by a writer of one of the hardest-hit South Carolina counties. He called for a radical change in the system of farming, and measures to attract native white settlers to replace the colored migrants. After pointing to the prosperity of other parts of the South, he contrasted this with his own county, where the traveller:

... would have seen poor, unkept and starving cattle; unditched red clay hills washed and torn into an hundred gullies; old, weathy [sic] beaten and shattered, unpainted houses half sheltering families of half-naked and poorly-fed women and children furnished with scarcely an extra chair in which to seat the chance visitor ...²⁰

18. Rufus Barringer, "Agricultural Depression. Its General and Special Causes," Prog. Farmer, v. 8 (March 28, 1893), p. 1.

19. B. Hamilton, "Things As They Are," The Plantation, n. s., v. 3 (Aug., 1873), pp. 452-453; Anon., "Items from Blackstock," Fairfield News and Herald (Winnsboro, S. C.), Jan. 13, 1886, p. 3.

20. Anon., "Why Farming Does Not Pay," by X, Fairfield News and Herald (Winnsboro, S. C.), Jan. 12, 1887, p. 3.

Expansion of Cotton Acreage on Basis of Commercial Fertilizer

Importation of Peruvian guano and its use in the United States increased until 1867, but after that date the supplies diminished rapidly both in quality and quantity. Natural guanos from other sources continued to be used for some time afterward, but by the early 1870's main reliance was beginning to be placed in the "manipulated" fertilizers. Just as the supply of natural guano was running low, the phosphate rock beds near Charleston, South Carolina were beginning to be exploited, and ammoniated super-phosphates and acid phosphates were put on the market. These early artificial manures were lacking in potash, but before long this deficiency was being supplied by imports of kainit from Germany and other sources. Around 1880 mixed fertilizers containing all three of the principal plant foods--nitrogen, phosphoric acid, and potash--were coming into general use.²¹

There has been a general long-time improvement in the quality of fertilizers available in the southeastern states, as measured by the percentage of available plant food.²² On the other hand,

21. Arnon L. Mehring and Avis J. Peterson, "The Development of Mixed Fertilizers in the United States," in 1934 Year Book, Commercial Fertilizer (Atlanta, Ga.), pp. 33-44; Ga. Comm. of Agri., Annual Report, 1875, pp. 93-104; Rosser H. Taylor, "The Sale and Application of Commercial Fertilizers in the South Atlantic States to 1900," Agri. History, v. 21 (Jan. 1947), pp. 46-52.

22. Mehring and Peterson, loc. cit.

Exposition of Certain Aspects of the

The production of fertilizer has increased rapidly both in quality and quantity. Natural guano was continued to be used for some time afterwar-
but by the early 1870's main reliance was beginning to be placed
in the "synthesized" fertilizers. Just as the supply of natural
guano was running low, the Government took steps to encourage
the fertilizer industry to be organized, and encouraged
export incentives and other privileges were given to the industry.
These early synthetic sources were limited in output, but during
that this industry was being supplied by imports of natural guano
from other countries. Around 1880 mixed fertilizers con-
taining all three of the principal plant foods--nitrogen, phos-
phorus and potash--were coming into general use.

There has been a steady long-term improvement in the quality
of fertilizer available in the United States since its invention
in the nineteenth century.

1. James I. Thompson and wife, "The Development of
United Fruit Company in the United States," 1921, 1922, 1923-
1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933,
1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943,
1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953,
1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963,
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1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993,
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2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213,
2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223,
2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233,
2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243,
2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253,
2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263,
2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273,
2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283,
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the individual farmer often complained that he had been cheated, and that the prices were too high. State officials charged with administration of the fertilizer inspection laws, experiment station workers, and farmers themselves constantly urged reliance upon barnyard manure, cotton seed, and pea crops to supply nitrogen, and the purchase of only phosphates and potash. The selling or wasting of cotton seed, when it should have been returned to the land, was especially decried.²³ Such talk was especially appealing in times of low cotton prices, and some farmers practiced these teachings. The purchase of complete mixtures on credit was nevertheless a tempting way to make a quick crop of cotton for farmers already hounded by debt, and the sale of the extra cotton seed to the cottonseed mills rather than its return to the soil, brought in additional needed cash.²⁴

The picture of hard times and abandonment of farm lands drawn in the above section applied primarily to the Cotton Plantation Area. The use of commercial fertilizer brought new cotton land into cultivation in the Cotton Farming Area, and in some parts of the Plantation Area, and this in turn helped to ameliorate the effects of the depression.

23. J. S. Newman, "Commercial Fertilizers--Composts," Sou. Planter, 3rd ser., v. 42 (Aug. 1881), p. 453-455; N. C. Experiment Station, "Home-Made Manures," N. C. Dept. Agri., Monthly Bul. (February 1882), p. 2; Anon., "Commercial Fertilizers," by Wm. T. S., Sou. Cult., v. 56 (March 1, 1898), p. 7; Anon., "A Cheap Compost Heap," Prog. Farmer, v. 14 (March 7, 1899), p. 1.

24. Cotton Report, 1880, part 2, p. 326; Hammond, South Carolina, p. 159; Anon., "Items From Dawkins," News and Herald (Winnsboro, S. C.), May 26, 1886, p. 3.

the fertilizer farmer often complained that he had been cheated, and that the price was too high. These complaints were not unfounded. The manipulation of the fertilizer inspection laws, enforcement of the laws, and farmers themselves constantly urged better laws. The fertilizer farmer, cotton seed, and the crops to which it was applied, and the purchase of only phosphates and potash. The selling of fertilizer of various kinds, and it was found that the quality of the land, was especially needed. Such talk was especially appealing in times of low cotton prices, and some farmers were tempted to use fertilizer. The fertilizer was nevertheless a tempting way to make a quick crop of cotton. The farmers already burdened by debt, and the sale of the crop season led to the cottonseed mills rather than the cotton in the soil, brought in additional needed cash. The practice of hard lines and abandonment of farm lands down in the lower section applied primarily to the Cotton Plantation Area. The use of commercial fertilizer brought new cotton land into cultivation in the Cotton Farming Area, and in some parts of the Plantation Area, and this in turn helped to maintain the status of the plantation.

U. S. Bureau of Agricultural Economics, Washington, D. C.
The following table shows the amount of fertilizer used in the United States in 1914, 1915, and 1916, by States and Territories.
The table is based on the report of the Bureau of Agricultural Economics, Washington, D. C., for the year 1916.
The table is in the form of a table, and the data is as follows:

| State or Territory | 1914 | 1915 | 1916 |
|----------------------|-----------|-----------|-----------|
| Alabama | 1,000,000 | 1,200,000 | 1,500,000 |
| Arkansas | 500,000 | 600,000 | 800,000 |
| California | 2,000,000 | 2,500,000 | 3,000,000 |
| Colorado | 1,000,000 | 1,200,000 | 1,500,000 |
| Connecticut | 100,000 | 150,000 | 200,000 |
| Delaware | 50,000 | 75,000 | 100,000 |
| District of Columbia | 10,000 | 15,000 | 20,000 |
| Florida | 1,000,000 | 1,200,000 | 1,500,000 |
| Georgia | 1,000,000 | 1,200,000 | 1,500,000 |
| Idaho | 1,000,000 | 1,200,000 | 1,500,000 |
| Illinois | 2,000,000 | 2,500,000 | 3,000,000 |
| Indiana | 1,000,000 | 1,200,000 | 1,500,000 |
| Iowa | 1,000,000 | 1,200,000 | 1,500,000 |
| Kansas | 1,000,000 | 1,200,000 | 1,500,000 |
| Kentucky | 1,000,000 | 1,200,000 | 1,500,000 |
| Louisiana | 1,000,000 | 1,200,000 | 1,500,000 |
| Maine | 100,000 | 150,000 | 200,000 |
| Maryland | 100,000 | 150,000 | 200,000 |
| Massachusetts | 100,000 | 150,000 | 200,000 |
| Michigan | 1,000,000 | 1,200,000 | 1,500,000 |
| Minnesota | 1,000,000 | 1,200,000 | 1,500,000 |
| Mississippi | 1,000,000 | 1,200,000 | 1,500,000 |
| Missouri | 1,000,000 | 1,200,000 | 1,500,000 |
| Montana | 1,000,000 | 1,200,000 | 1,500,000 |
| Nebraska | 1,000,000 | 1,200,000 | 1,500,000 |
| Nevada | 1,000,000 | 1,200,000 | 1,500,000 |
| New Hampshire | 100,000 | 150,000 | 200,000 |
| New Jersey | 100,000 | 150,000 | 200,000 |
| New Mexico | 1,000,000 | 1,200,000 | 1,500,000 |
| New York | 2,000,000 | 2,500,000 | 3,000,000 |
| North Carolina | 1,000,000 | 1,200,000 | 1,500,000 |
| North Dakota | 1,000,000 | 1,200,000 | 1,500,000 |
| Ohio | 1,000,000 | 1,200,000 | 1,500,000 |
| Oklahoma | 1,000,000 | 1,200,000 | 1,500,000 |
| Oregon | 1,000,000 | 1,200,000 | 1,500,000 |
| Pennsylvania | 1,000,000 | 1,200,000 | 1,500,000 |
| Rhode Island | 100,000 | 150,000 | 200,000 |
| South Carolina | 1,000,000 | 1,200,000 | 1,500,000 |
| South Dakota | 1,000,000 | 1,200,000 | 1,500,000 |
| Tennessee | 1,000,000 | 1,200,000 | 1,500,000 |
| Texas | 1,000,000 | 1,200,000 | 1,500,000 |
| Vermont | 100,000 | 150,000 | 200,000 |
| Virginia | 1,000,000 | 1,200,000 | 1,500,000 |
| Washington | 1,000,000 | 1,200,000 | 1,500,000 |
| West Virginia | 1,000,000 | 1,200,000 | 1,500,000 |
| Wisconsin | 1,000,000 | 1,200,000 | 1,500,000 |
| Wyoming | 1,000,000 | 1,200,000 | 1,500,000 |

Commercial fertilizers quickened the growth of the cotton and enabled it to come to maturity before frost in the shorter seasons of western North Carolina and the upper Piedmont of South Carolina and Georgia. It also facilitated the use of dry ridge lands which had previously been of little value. The amount of fertilizer inspected for sale in North Carolina increased from over 29,000 tons in 1878 to over 279,000 tons in 1900. In Georgia the tonnage inspected in 1874-1875 was over 48,000 and in 1899-1900 it was about 413,000.²⁵ The Director of the North Carolina Experiment Station remarked in 1882 that "with the help of super-phosphates cotton has marched forty or fifty miles up the country, even to the slopes of the Blue Ridge itself."²⁶ The agricultural officials of South Carolina and Georgia could have made the same observation.

The Cotton Farming Area was not forced to make as great a readjustment to the new labor conditions as was the Plantation Area, since operating units had been comparatively small before the war and a great many of the farmers had tilled their lands without the use of slaves or with the help of only a few. Cotton production expanded rapidly in this section after the war, continuing a trend which had started in the '50's and '60's when railroads first penetrated the area and commercial fertilizers were

25.N. C. Comm. of Agri., Reports, 1877-78, p. 16, and 1900, p. 2; Ga. Dept. of Agri., Commercial Fertilizers and Chemicals Inspected ... to Aug. 1, 1901, Bul., Serial No. 38 (Atlanta, 1901), p. 144.

26.N. C. Dept. Agri., Monthly Bul. (Jan. 1882), p. 3. See also Cotton Report, 1880, part 2, pp. 348, 351, 514, 587, 589-591.

Commercial fertilizers enhanced the growth of the cotton

industry of a state south Carolina and the other. It also facilitated the use of the

which had previously been of little value. The
inspector inspected for sale in North Carolina the
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the country. The tonnage inspected in 1918-1919 was over
of the year 1922-1923 it was about 275,000. The inspection of

the first inspection station reported in 1922 that "the
the bulk of the phosphate cotton has been sold to the

of the country, even to the extent of the Mississippi
The national officials of South Carolina are

might have made the same observation.

The National Fertilizer Association has not known to make a re-

inspection of the new fertilizer conditions as was the inspection of
the fertilizer industry has been comparatively small before the war

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duction was rapidly in this section after the war, certain

and a great many which had started in the '30's and '40's when fertil-

izers first penetrated the area and commercial fertilizers were

U. S. Department of Agriculture, Bureau of Plant Industry, Washington, D. C.
Circular 101, 1918, p. 10. and 1919, p. 10.

U. S. Department of Agriculture, Bureau of Plant Industry, Washington, D. C.
Circular 101, 1918, p. 10. and 1919, p. 10.

made available. The railway network was completed in the two decades after 1865, the most important new line being the Atlanta and Richmond Air Line Railroad, furnishing the first direct connection for the upper Piedmont with the industrial northeast.²⁷

The cotton crop brought more ready cash to many small farmers in the upper Piedmont than they had ever hitherto received from corn and wheat production. In the 1870's as cotton expanded it brought prosperity. Grain production still continued to supply local needs, so that the proceeds of the cotton crop in large measure represented clear profit. It appeared to some that fertilizers had solved the problem of sustaining fertility, and even the experiment station official quoted above believed that fertilizers had strengthened the land sufficiently to put cotton culture on a permanent basis. Others, however, were not so optimistic. One writer asked in 1873 what the results of the expansion would be, and answered his own question gloomily:

... it will lead these farmers into the same fatal error of the planters of the middle and lower country. They will neglect their provision crops. They will buy fertilizers at any price. They will plant cotton on land not adapted to cotton in this latitude. In their eagerness to grow rich, they will cut down their timber and burn the brush which ought to be used in building brakes or hedge-rows along the hill-sides to secure the land against washing. They will expect to save the land by the same old system of hill-side ditching which ruined some of the best land of the middle country ... The towns will be improved, no doubt; merchants and phosphate companies will sell to the farmers on credit, all they ask for, secured by a lien on the cotton

27. Anon., "The Air-Line Railroad," Keowee Courier (Walhalla, S. C.), April 25, 1873, p. 2.

crop; money will be abundant, but the farmers will have little to do with the handling! Their uplands will be washed away, and their bottom lands covered with the sand of the hill-side ditches.²⁸

By the end of the decade at least some of these prophecies were beginning to come true, and the farmers were beginning to feel the pinch of narrowing profits caused by the lowering prices of cotton and the rising cost of fertilizers. They were beginning to meet and protest, and to form the basis for the political action that came to a head in the 1880's and 1890's. At the same time there were the familiar complaints about gullies, destruction of forests, and poor farming.²⁹

In spite of hard times the trend toward greater cotton acreages continued in the Cotton Farming Area. The area in cotton increased from 975,000 acres in 1879 to 1,523,000 acres at the end of the century. Expansion continued until after World War I, the acreage in 1919 being slightly over 2 million. (See Appendix No. II, Table No. 3.) Production by 1879 had already reached 177 million pounds, as compared with the 1859 crop of about 60 million. By 1919 the crop was over 535 million pounds. Increased cotton production was accompanied by a general increase in the acreage of improved farm land from 3 and one-half million

28. N. H. Davis, "Causes of Success and Failure in Cotton-Planting in the Hill Country," The Plantation, n. s., v. 3 (July 1873), pp. 389-392.

29. Anon., "The Fertilizer Excitement," Spartanburg Herald, Feb. 5, 1879; Anon., "Farmers Meeting," ibid., Feb. 19, 1879; Anon., "Spartanburg, Its History and Resources," ibid., Feb. 26, 1879.

[illegible]

in 1880 to over 5 million during the period 1910-29. (See Appendix No. II, Table No. 4.) Meanwhile, although there was an increase in the acreage and production of corn, it was not as great in proportion as that of cotton, and there was an over-all decline in the crops of wheat and oats.

Fertilizers enabled farmers in the Cotton Plantation Area to bring into production certain lands that had been neglected in the days of slavery. These lands included mainly gray, rather coarse sandy loams of the Cecil, Appling, and Durham series. Apparently they had not been utilized to any great extent in earlier times because they were naturally deficient in plant foods and were less valuable for the production of grains than the red or mulatto clay loams or the finer grained sandy loams. Soils of the latter two types were better adapted to the mixed production of cotton and grains, with the aid of little or no manure or fertilizer, such as characterized the plantation agriculture of the antebellum period. Small farmers had opened up the coarse sandy loams to some extent before the Civil War, but the greatest amount of clearing and settlement came afterward. In the 1870's, 1880's, and later, fertilizers and cotton production caused these lands to increase greatly in price. Resident farmers increased their holdings and merchants in the nearby towns bought up large tracts.³⁰

30. Anon., "Waste Labor," Fairfield News and Herald (Winnsboro, S. C.), July 21, 1880, p. 2; J. Frank Fooshe, "Fairfield's Fine Farms," The State (Columbia, S. C.), p. 10; Arthur F. Raper,

the average and production of cotton, it was not as
great as the position as that of cotton, and there was an over-
all of the crops of wheat and corn.
... certain factors in the cotton situation were to
be the production of cotton which had been neglected in
the days of slavery. These factors included mainly such, rather
than the forms of the soil, climate, and human action.
... had not been utilized to any great extent in
planting times because they were naturally deficient in plant
food and were less valuable for the production of cotton than
the soil and climate they found at the time planted sandy lands.
... the soil and climate they found at the time planted sandy lands.
... with the aid of little or no
... such as characterized the plantation system
... Small farmers had opened up
the waste lands of the South and West and had
the highest state of civilization and settlement came afterwards.
... and they had
... these lands to increase greatly in price. Farmers
... and their holdings and maintenance in the North
... of large tracts.

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At the same time, areas composed predominantly of dark colored clay loams that had been valuable for general crop production under the regime of plantation slavery declined after the introduction of unsupervised tenant or cropper labor.³¹ Other old plantation areas that had been depleted and eroded were eventually abandoned. At present the coarse sandy lands are the centers of some of the most prosperous farming communities in the lower cotton Piedmont. The farm houses are generally small post-Civil War types and are fairly well kept. The large plantation mansions, built in the grand style, but now, more often than not, abandoned and dilapidated, are generally found where the clay loams and eroded sandy loams predominate.

The turn of the century ushered in a period of greater prosperity for the cotton farmer. In the years 1900-1919 there was a general upward trend in cotton prices, culminating in the boom times of World War I. Farm owners were able to pay off their debts and to operate on a cash basis to a greater extent than in the previous decades. New sources of credit were made available by the opening of state and national banks in the small towns. The growth of industries--cotton mills, cotton seed oil mills, etc.--which had started in the 1870's and 1880's, continued apace.

Preface to Peasantry (Chapel Hill, N. C., 1936), pp. 12-13, 91, 114; Raper, Tenants of the Almighty, pp. 111-118; Information secured from Mr. T. C. Camak of Fairfield County, S. C.

31.[Harry Hammond], South Carolina: Resources and Population, Institutions and Industries (Charleston, 1883), p. 167.

At the same time, the Government has been making every effort to improve the conditions of the people. It has been successful in many respects, and the people are now better off than they were before. The Government has been able to do this because of the help of the people. The people have been very cooperative and have done their best to help the Government. The Government has been able to do this because of the help of the people. The people have been very cooperative and have done their best to help the Government.

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Although these conditions relieved the agrarian distress of the late nineteenth century, they did not change the basic pattern of one-crop economy and tenancy. The better prices only served to fix the supremacy of cotton more strongly and to lessen the emphasis on grains. Acreages in cotton increased from 3,198,000 in 1899 to 3,841,000 in 1919 for the two Cotton Areas, whereas the areas devoted to corn, wheat, and oats decreased from 3,371,000 acres to 2,893,000 acres in the same period. When the price of cotton had been low in relation to that of other farm products there had been a tendency to go into side lines such as dairies or the stall feeding of steers, but these ventures were abandoned when cotton again became more profitable.³² There was some increase in the production of hay crops, and in a few badly worn plantation sections greater diversification continued, but this was exceptional.³³

Credit from the local banks could be secured by enterprising farmers at lower interest rates than from the merchants, but such credit was automatically restricted to those who were considered "good risks." The cropper-tenants and even some farm owners thus benefited very little from bank credit.³⁴ The percentage of

32.J. F. Fooshe, "Fairfield's Fine Farms," The State (Columbia, S. C.), Jan. 24, 1907, p. 10; Raper, Tenants of the Almighty, pp. 142, 170.

33.Compare the table for Fairfield Co., South Carolina in Appendix No. IV with those for other cotton counties.

34.Banks, op. cit., pp. 58-61.

tenant-operated farms continued to increase, even in the upper Piedmont outside the Plantation Area. In the upper Piedmont of Georgia, for instance, the proportion of tenants was 42 percent in 1880, 62 percent in 1900, and 65 percent in 1910.

The status of many tenants was improved. Cash tenancy tended to increase although the majority of the renting continued to be on the share basis. Tenure in this upper Piedmont commenced to be of a higher type also, some tenants signing contracts to be in force for as long as four years, binding them to keep the land in good condition and to furnish labor for building terraces. Nevertheless the increase in land prices in the first decade of the twentieth century deterred tenants from taking the upward step to ownership. In the plantation districts there was a partial return to the system of operating in large units. Town merchants combined their own holdings with land leased from absentee owners and placed share croppers or wage hands on these lands. Direct supervision was given to the laborers by resident managers and "riders" representing the merchants. It was claimed that this system was more efficient from the standpoint of production and soil conservation. The tenant class in the plantation sections was increased by small farmers who moved out of the higher-priced lands farther up-country to rent abandoned lands formerly in plantations. The number of farms owned by negroes increased somewhat.³⁵ Thus, although the better times of the early 1900's

³⁵Brooks, op. cit., pp. 76-79, 87-97; Banks, op. cit., pp. 70-76, 94-116.

is about 50 percent in 1900, and 50 percent in 1900.

[illegible]

caused some amelioration in the condition of the tenant and crop-per class, this was slight in relation to the whole picture. A writer of Greene county, in the Plantation Area of Georgia, declared in 1911 that the condition of the great majority of farmers was worse than it had been 30 years previously, and he blamed this condition on "All cotton and the tenant system." Like reformers of the region before and afterward, he pleaded for more living at home, increase in the production of livestock and foodstuffs, and less dependence on western sources for these items.³⁶

Establishment of the cotton milling industry at first provided a market for locally raised cotton and helped to furnish the impetus for the great expansion in production in the upper Piedmont. However, the cotton mills eventually depended upon the longer-staple cotton of the Mississippi delta and the west as a source of raw material, while the short-staple Piedmont cotton continued to be exported.³⁷ The cotton textile industry has benefited agriculture in the Piedmont only indirectly, by draining off the excess labor supply of the worn out farms and, to a small extent, by creating urban centers that furnish markets for diversified farm products. In this respect the cotton textile

36. Raper, Tenants of the Almighty, pp. 143-144.

37. Vance, Human Geography of the South, pp. 291-292; J. Norman Carls, Studies in the Economic Geography of Anderson County, South Carolina, Clark University Ph.D. Dissertation in Geography, 1935, MS, pp. 67-73, 79-80. Examined through the courtesy of the author.

industry differs from the tobacco industry, for the latter not only absorbed the surplus labor but also the product of surrounding farms. Cotton seed oil milling benefited the farmer directly. It provided an additional source of income from a byproduct of cotton farming that formerly had been waste, and in return furnished cotton seed meal, a form of fertilizer and stock feed that was much more efficient than the whole cotton seed. After the establishment of this industry the old advice to the farmer to save his surplus seed for fertilizer was reversed. He was now urged to sell his seed and buy meal.³⁸

As greater attention was devoted to cotton in the upper Piedmont and more dependence was placed on the west for provisions, there was a relative decline in the importance of bottom lands. The expansion of cotton cultivation took place on the uplands, and with commercial fertilizer more corn and small grains were raised here also, whereas in antebellum times a goodly proportion of the corn crop had been made on river and creek bottoms. The declining importance of the bottoms was dramatized in the early 1900's by a series of extraordinary floods on the Catawba River and many of the streams south of it. The floods were caused primarily by lumbering operations and subsequent burning of the deforested areas in the mountains around the sources of the streams flowing outward across the Piedmont to the Atlantic. Much valuable farm land in the bottoms was either torn up and

³⁸Carls, op. cit.; Soil Survey, Saluda Co., S. C. (1910), p. 14.

[illegible]

eroded down to the sterile substratum or buried so deeply in sand as to be worthless. Damage to the bottom land on the Catawba as a result of the flood of May 1901 was conservatively estimated at \$500,000.³⁹ Later investigation by members of the United States Geological Survey revealed that much bottom land was annually rendered useless by flood deposits and that the reservoirs of the cotton mills and power plants were often completely filled in the course of a few years. It was stated that the clearing and cultivation in cotton of the uplands near the foot of the mountains had caused the washing of sediment into the rivers, causing the good bottom lands to become water logged and the stream channels to become so choked that destructive flooding was much more common than formerly. The great freshets of June 1903 on the Pacolet and Tyger Rivers in Spartanburg County, South Carolina were attributed to this situation. It was claimed that in this county the destruction of the good corn lands by flooding had caused the abandonment of the bottoms and importation of corn from the west until the farmers could learn to raise it on the uplands.⁴⁰

39. Wade H. Harris, "The May Flood (1901) in the Southern Appalachian Region," Forestry and Irrigation, v. 8 (March 1902), pp. 105-109.

40. L. C. Glenn, Denudation and Erosion in the Southern Appalachian Region, pp. 13, 111 ff.

Maps No. 1 and 2 showing the Anderson farm, Spartanburg Co., illustrate the shift in cultivation from the low grounds to the uplands. Around 1880 the cleared portion of the farm included mainly the low grounds on Ben's Creek and South Tyger River and

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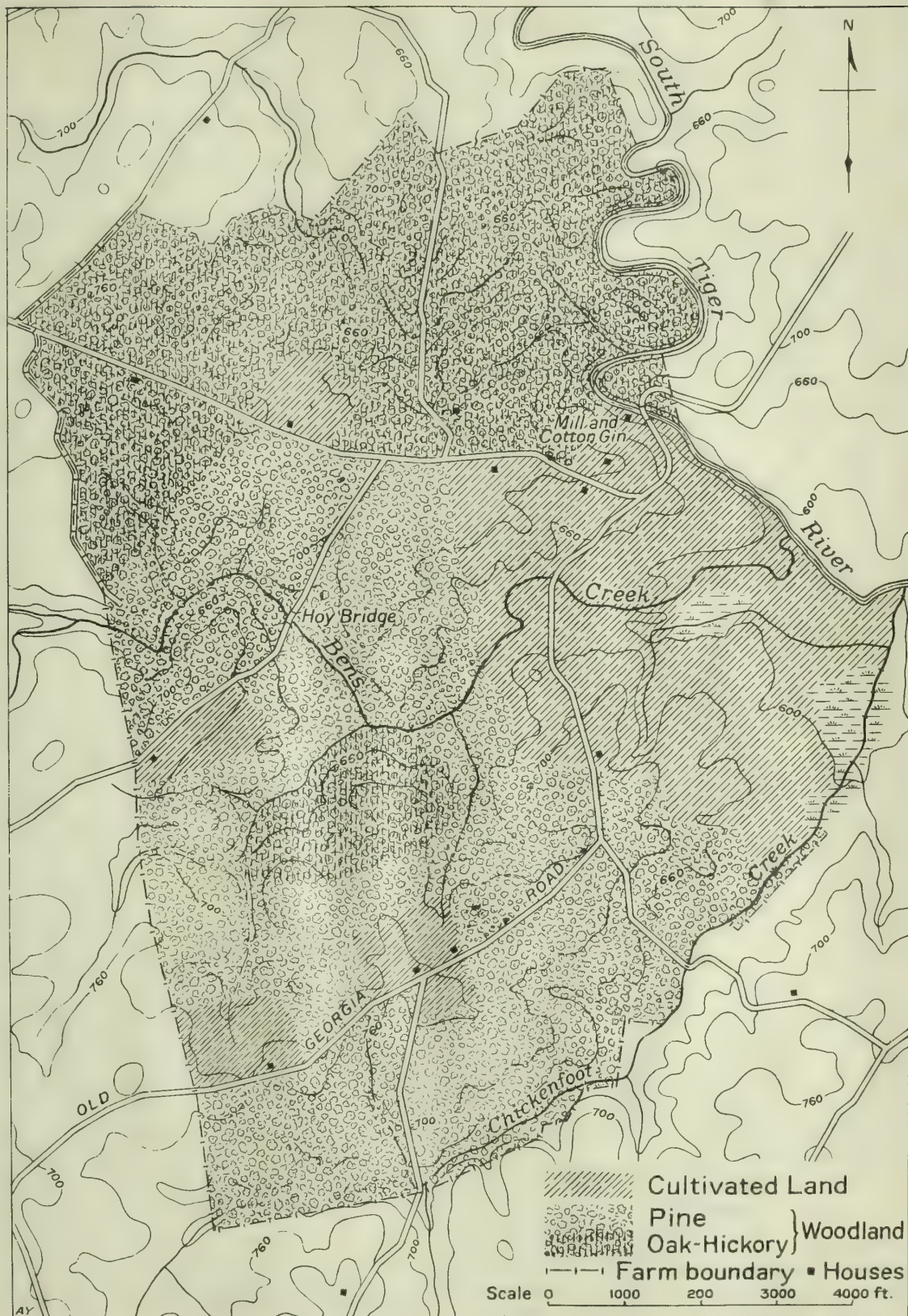
Assertions have been made that upland clearing and cultivation had caused abandonment of stream border lands and had changed the character of agriculture in different areas.⁴¹ The cause and effect relationship was, however, not so direct. As pointed out elsewhere in this study, the Piedmont farmer tilled lowland corn crops from early times, counting on the richness of the soil to make up for the occasional losses from high water. He often noted that cultivation of the adjacent highland caused accumulation of sediment on the bottoms, but opinions were divided as to whether these deposits were beneficial or harmful. Their effects on the bottoms doubtless depended upon the texture of the sediment--whether it was sand or silt--and the speed at which it was deposited. Even after the floods of 1905 on the Savannah and adjacent streams, L. C. Glenn found that in some cases the bottom lands had been benefited and in other cases injured by the deposits.⁴² The floods in Spartanburg county could

the adjacent upland. Most of the remaining upland was forested, either in old field pine or virgin timber. At this time the bottom lands were in corn and meadow and the uplands in cotton, small grain and clover. There was a grist mill and cotton gin on Tyger River. When the owner died the place was divided among his children and more cotton was raised on one of their farms than had been raised on the entire 1880 holding. Early in the 1900's floods on the river cut down the value of the low ground and about the same time the mill site was abandoned. By 1937 the low ground was mostly a marshy waste and farming was conducted almost entirely on the upland. The principal crops in 1937 included cotton, corn, small grains, and orchard products. (Information furnished by Mr. W. C. Anderson and Mr. Berry Cunningham.)

⁴¹ See for instance page 83.

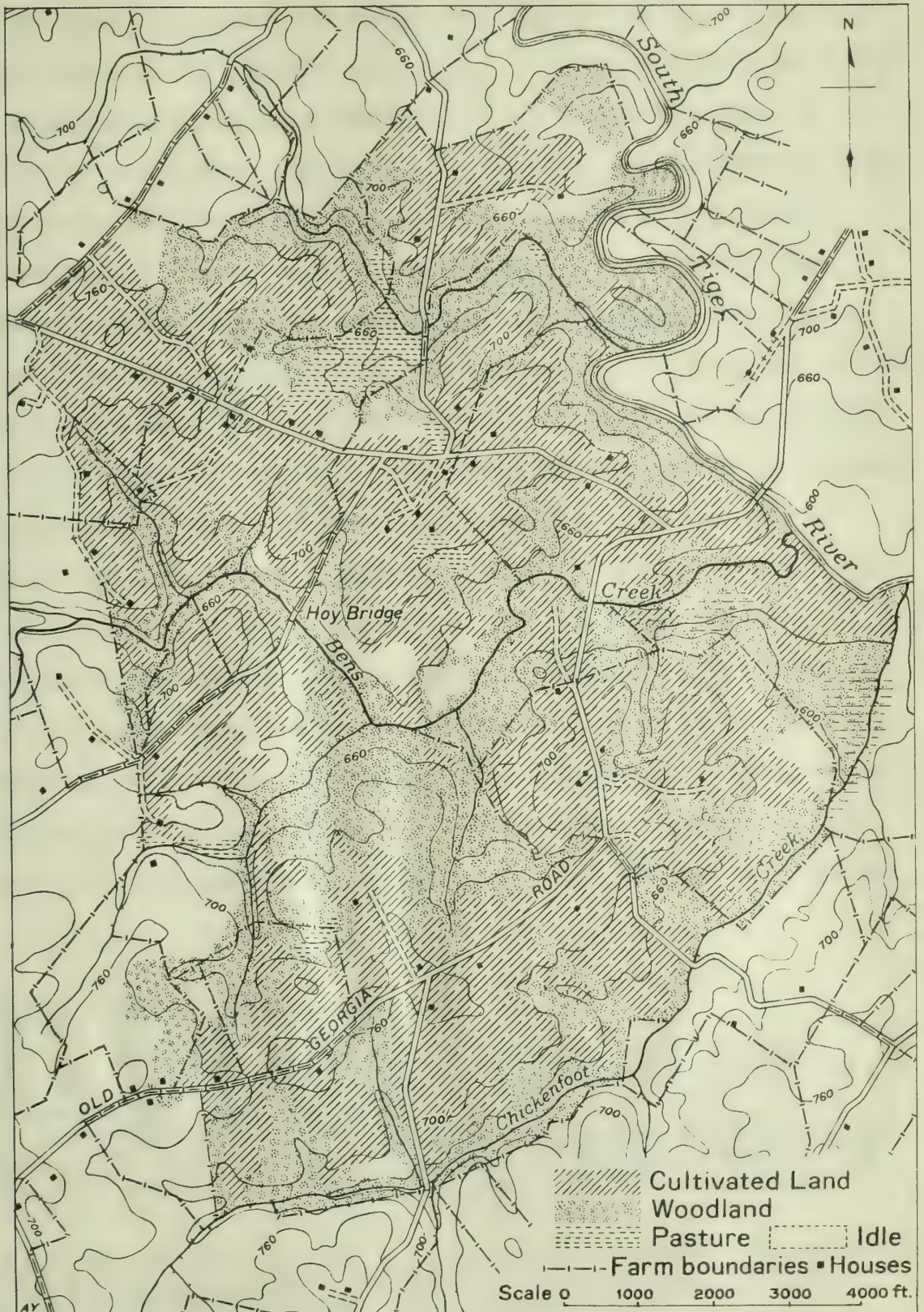
⁴² Glenn, op. cit., pp. 105-106.

The Anderson Farm-1880



Map No. 1
(in text)

Area of the old Anderson Farm -1935



Map No. 2
(in text)

scarcely have been the sole cause of the importation of western grain, for as early as 1880 the parts of South Carolina near the foot of the mountains were beginning to depend upon outside sources for provisions, as cotton became the most important crop and as railways penetrated the area.⁴³ The damage to lowlands from erosion at higher levels and changes in stream regimen as channels became clogged should not be minimized, for the literature attesting to this fact, and proposing the drainage of lowlands, is abundant.⁴⁴ The problem did indeed become more urgent as more land was cleared for cotton and the mountains to the west were stripped of their timber. However, the clearing in the upper Piedmont was to some extent offset by natural reforestation of abandoned fields, especially in the lower Piedmont.⁴⁵ The economic causes for the relative decline of agriculture on the bottom lands were fully as important as the physical ones. The raising of greater amounts of cotton meant the buying of more provisions and less dependence on bottom land grain crops and pasture. It also meant the clearing and erosion of more upland,

43. Cotton Report, 1880, part 2, p. 522.

44. Anon., "Drainage of Lowlands," by Inquirer, Spartanburg Herald, May 7, 1879; John K. Goodman, "Mistakes of Fifty Years to be Remedied," Prog. Farmer, v. 22 (Oct. 10, 1907), p. 14; N. C. State Land Commission, North Carolina Land Conditions and Problems, The Report of the State Land Commission appointed by the General Assembly of North Carolina, 1923 (n.p., n.d.), pp. 26-29.

45. T. W. Woodward, "Speech ... before the Barnwell Agricultural Society," Fairfield Herald (Winnsboro, S. C.), Nov. 22, 1871, p. 1.

sending down destructive accumulations on bottom lands that were already becoming less important.

Crop Management After the Civil War

The principal changes of significance in cropping practices after the Civil War revolved around the increasing use of fertilizers. Cotton and corn continued to be cultivated very much as in former times, and the instruments of cultivation were about the same. By the early 1880's the fertilizer horn, used for distributing the fertilizer in the drill by hand, was in general use, although it was being replaced by wheeled distributors.⁴⁶

In the early 1880's mixtures of commercial fertilizers, barnyard manure and cottonseed were used to a large extent. Commercial fertilizers were applied on cotton land at the rate of 100 to 400 pounds per acre, the more successful farmers using the heavier applications. Use of commercial fertilizers would not maintain the soil in its virgin fertility, but it would prevent the effects of depletion from becoming apparent as soon as if they were not used. Thus, on fresh red lands in Georgia the yields were from 300 to 1,000 pounds of seed cotton per acre. After 10 years' cultivation the yields obtained without fertilizer were from 250 to 700 pounds, but if fertilizers were used

⁴⁶. Cotton Report, 1880, part 2, pp. 325-327.

yields on both old and new red lands could be maintained at about 685 pounds of seed cotton per acre.⁴⁷ About this time F. C. Furman of Milledgeville, Georgia attracted wide attention by raising 75 bales of cotton and 500 bushels of oats from 65 acres of old land that had formerly yielded but 8 bales of cotton. He applied progressively greater quantities of composted manure, cottonseed, acid phosphate, and kainit to the land from year to year, the maximum application being 4,000 pounds per acre in 1882 when the large crop was raised. He claimed that this was a cheap method of raising cotton, the cost being only four and one-half cents per pound, compared with an average cost of from 7 to 10 cents. Furman thought that he had worked out the exact quantity of materials taken from the soil by a cotton crop and his principle was to restore each year twice the plant food extracted by the crop of the preceding year, thus building up the land while increasing the crop. He found many to praise him but few to follow his example.⁴⁸

The per acre yields of principal crops nevertheless increased after 1880, as is indicated in Tables No. 7 and 8. This has been due not only to the use of more fertilizer but also to improved varieties of plants and to some extent, to better crop management.

47. Cotton Report, 1880, part 2, pp. 300-301, 323; Dickson, op. cit., pp. 57-58; W. S. Sharpe, "Farming That Pays," Keovee Courier (Walhalla, S. C.), Jan. 3, 1873.

48. Cotton Report, 1880, part 2, p. 324; Anon., "Furman's Farm," Sou. Planter, 3rd ser., v. 44 (Jan. 1883), pp. 39-43.

[illegible]

Individuals such as David Dickson of Hancock county, Georgia and David R. Coker of Hartsville, South Carolina, as well as the state experiment stations, did much to develop varieties of cotton that would yield more abundantly. In more recent times long-staple cottons adapted to the upper country have been introduced, and there have been efforts toward uniformity in the production of better cotton grades.⁴⁹

Table No. 7

Cotton Farming Area
Yield Per Acre of Principal Crops

| | | <u>1879</u> | <u>1899</u> | <u>1929</u> | <u>1939</u> |
|--------|------------|-------------|-------------|-------------|-------------|
| Corn | bu. | 12.3 | 11.3 | 14.6 | 13.2 |
| Cotton | lb. (lint) | 182 | 186 | 252 | 337 |
| Oats | bu. | 7.7 | 7.9 | 21.3 | 22.0 |
| Wheat | bu. | 6.1 | 5.9 | 10.0 | 12.7 |

Table No. 8

Cotton Plantation Area
Yield Per Acre of Principal Crops

| | | <u>1879</u> | <u>1899</u> | <u>1929</u> | <u>1939</u> |
|--------|------------|-------------|-------------|-------------|-------------|
| Corn | bu. | 8.4 | 7.9 | 11.6 | 9.3 |
| Cotton | lb. (lint) | 156 | 159 | 201 | 304 |
| Oats | bu. | 10.4 | 10.2 | 22.1 | 20.6 |
| Wheat | bu. | 6.9 | 6.0 | 8.9 | 9.9 |

⁴⁹Soil Survey, Hart County, Ga. (1929), p. 28.

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After the beginning of the present century the use of barn-yard compost almost disappeared, and even the home mixing of manufactured fertilizer materials declined in favor of the complete preparation.⁵⁰ In the second and third decades the available percentages of plant food in complete fertilizers applied to cotton typically were 3 of nitrogen, 8 or 9 of phosphoric acid, and 3 of potash. Often the same grades were used on all types of soil on the farm, with little regard to, or indeed little knowledge of whether the soil might require the specific amounts of plant foods used. The total amount of fertilizer applied per acre varied rather widely. Applications ranged from less than 200 to about 1,000 pounds per acre, the more general amount being probably from 300 to 600 pounds. Toward the end of the period, after the boll weevil invasion, there was a tendency in some areas to use better grades of fertilizer, such as 4-10-2, 4-10-4 and 4-12-4. Side dressings of 75 to 100 pounds of nitrate of soda per acre were often supplied to stimulate the growth of the crop after it was up.

On some of the clay loam and "black jack" soils where a potash deficiency caused rust in cotton, some farmers occasionally corrected this by applications of kainit. During World War I importations of potash from Germany ceased, and as the war progressed the shortage of other fertilizing materials became

50. Rosser H. Taylor, loc. cit., p. 52.

critical.⁵¹

Fertilizing practices for corn and small grains were not as uniform as for cotton. In many areas corn was rarely fertilized at the time of planting, although side dressings of nitrate of soda were applied later. Other farmers, however, applied complete mixtures to the corn. Organic manures saved on the farm were still occasionally applied to corn and small grains. Oats were often given an application of about 200 pounds per acre of super-phosphate (acid phosphate) at the time of planting in the fall, and in the spring a top dressing of 75 to 100 pounds of nitrate of soda.⁵²

Sometimes simple rotations of cotton, corn, and small grain were practiced, but such a large proportion of the land was devoted to cotton that rotations were not generally adopted. Cow-peas were still planted with corn. The more progressive farmers used rotations designed to provide food and feed products, restore organic matter to the soil, and keep a winter cover crop on the land to prevent erosion. Such rotations might consist of corn and peas first year, small grain followed by peas second year, and cotton third year, although there were many variations to this pattern. Winter legumes such as crimson clover, Austrian

51. Soil Surveys: Saluda Co., S. C. (1910), pp. 13-14; Newberry Co., S. C. (1918), pp. 24, 27, 31; Lamar Co., Ga. (1925), p. 11; Hart Co., Ga. (1929), pp. 12, 15, 20, 23, 28; McDuffie Co., Ga. (1931), pp. 14-16, 20; Greenwood Co., S. C. (1929), pp. 11, 17, 22.

52. See citations in footnote 51.

winter peas, or vetch were introduced into the rotation, so that practically every winter the ground was covered with either small grain or legumes. The winter legumes were turned under in the spring to enrich the land. The peas and oats could be either harvested and the residue turned under, or mown for hay. Velvet beans were sometimes planted instead of peas. Rye was sometimes sown with the winter legumes.⁵³ In connection with an attempt to persuade small farmers to raise more food the Progressive Farmer, in 1923, gave tables of acreages in different crops recommended for a farm of 60 cultivated acres supporting a family of five. If cotton were raised it suggested that only 10 acres be devoted to that crop, compared to 24 acres in corn and legumes, 8 acres in oats, 4 in wheat, and 12 acres in vegetables, fruit, potatoes, and miscellaneous food and cash crops. Legumes were to follow grains on 14 acres, and there was to be pasturage on 8 acres of the crop land.⁵⁴

The outmoded fence laws were modified in the 1870's, allowing counties or their subdivisions to require the enclosure of pasture instead of cultivated fields. The reform was opposed for a time by renters who had been accustomed to allow their scrub stock to roam the countryside, but the confinement of stock to

⁵³. Charles Petty, "Thoughts for Farmers," Prog. Farmer, v. 19 (Feb. 7, 1905), p. 3; T. J. Bloom, "Good Seed, Good Soil, Good Cultivation," Prog. Farmer, v. 22 (Feb. 28, 1907), p. 14. See also citations in footnote 51, page 246.

⁵⁴. Anon., "A Cropping System With and Without Cotton," Prog. Farmer, v. 38 (March 31, 1923), p. 358.

...the ground was covered with other small
...the winter legumes were turned under in the
...the land. The peas and oats could be sown
...the residue turned under, or saved for hay. Velvet
...planted instead of peas. The year was
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...the year.

The revised force laws were modified in the 1870's, allowing
...of cultivated fields. The police was ordered for a
...who had been accustomed to allow their
...the correction, and the commitment of stock to

...J. J. Rice, "Good Soil and Good Seed,"
...v. 22 (Nov. 22, 1911), p. 17.
...of, page 246.

fenced pastures became law eventually throughout the Piedmont. In many areas this resulted in a decrease in the number of animals, perhaps most of them belonging to small farmers or renters, but the remaining stock was improved. In Campbell county, Georgia it was claimed that ordinary milk cows increased in value from between \$15 and \$25 to between \$40 and \$50 per head as a result of the new fence law.⁵⁵

A great saving in time and timber resulted from the repeal of the old requirement that each individual field must be fenced. In addition, it was found that the natural growth of weeds, grasses, and shrubs on uncultivated land was improved when cattle and hogs were no longer allowed to graze or root indiscriminately. Species of wild peas and vetches thought to have become extinct made their reappearance in the woods.⁵⁶ The land owner's reserve of virgin land and recuperating old field was thus protected at the same time that his cattle and hogs were given better care, although the new arrangement sometimes worked hardship on the renter or landless farm laborer.

The fence law reform and the eradication of cattle tick fever (see Chapter IV) overcame two of the most important obstacles to animal industries. There were individual instances of successful

55.Ga., Comm. of Agri., Report, 1881 and 1882 (Atlanta, 1882), p. 52.

56.Hammond, op. cit., p. 167.

These animals were the most numerous throughout the district.

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the district was that of the animals belonging to small farmers on small

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livestock farming in the cotton Piedmont between the Civil War and the boll weevil invasion, instances that attracted attention because of their contrast with the general background of cotton production. General J. Bratten of Fairfield county, South Carolina was a raiser of sheep and Ayrshire cattle, whose plantation resembled "a Kentucky blue-grass farm."⁵⁷ Joseph T. Anderson of Cobb county, Georgia operated a dairy farm, caring for about 100 head of cattle, around the turn of the century.⁵⁸ Richard Peters of Atlanta was a breeder of Angora goats, and a foremost advocate of agricultural reform both before the Civil War and after.⁵⁹ There were other livestock specialists such as these men. The postbellum conditions of small farms, lack of credit, high proportion of tenancy, and the habit of raising cotton discouraged stock enterprises by a majority of farmers.

A beginning was being made before the end of the century toward solving the problem of hay and pasture plants, as discussed in Chapter IV. It was recognized that red clover, timothy, and other plants suitable to a more northerly climate, would succeed only near the mountains or on rich bottom lands under special care. It was hoped by some enthusiasts that alfalfa (called by

57.G. H. McMaster, "Sheep in South Carolina," Sou. Planter, 3rd ser., v. 55 (Jan. 1894), p. 15.

58.[Frank E. Emory], "A Record of Progressive Farming," Prog. Farmer, v. 14 (Nov. 14, 1899), p. 1.

59.James C. Bonner, "The Angora Goat: A Footnote in Southern Agricultural History," Agri. Hist., v. 21 (January 1947), pp. 42-46. Peter's goat farm was in the Oothcaloga valley in north Georgia.

[illegible]

the older name lucerne until recent decades in this region) could be established as a successful hay plant. On the clay loams fairly high in calcium content, such as Davidson clay loam, it prospered, but these soils were too restricted for its widespread adoption.⁶⁰ Hay production in the two Carolinas and Georgia increased from about 1,090,000 tons in 1919 to about 1,888,000 tons in 1939, and annual legumes saved for hay accounted for most of this increase, accounting for 38 percent of the crop in the former year and 58 percent in the latter. These legumes included soybeans, cowpeas, peanuts, velvetbeans, and others less important. Peanuts and velvetbeans, however, are raised mainly in the Coastal Plain. Crimson clover was used for hay, but it found its greatest use as a green manure and winter cover crop.⁶¹

Agricultural Organization and Reform

Following the Civil War a number of state and local farmers' organizations, patterned along traditional lines, were reconstituted. They were dedicated to the holding of fairs and the discussion of farming techniques. In the decade after Appomattox

60. U. S. Comm. of Agri., Report, 1866, pp. 576-577; Soil Surveys: Newberry Co., S. C. (1918), p. 31; Greenwood Co., S. C. (1929), p. 19; Vance, Human Geography of the South, p. 156.

61. Anon., "Scarlet Clover and Cow Pea Vines to Enrich Wornout Soils," Sou. Cult., 1st ser., v. 51 (Oct. 1893), p. 457; Harry Snowden Stabler, "Crimson Clover Bob," Country Gentleman, v. 81 (July 8, 1916), pp. 3-4.

the widespread dissatisfaction with the lien laws, high priced and spurious fertilizers, and low priced cotton, found its vehicle of expression in the new type of organization, the Grange. Vigorously promoted by D. Wyatt Aiken, a national leader in the movement and co-editor of the Charleston monthly Rural Carolinian, the Grange mushroomed in South Carolina between 1872 and 1875 until it claimed about 10,000 members of the latter year. Its stronghold seems to have been in the Piedmont part of the state, Aiken himself being from Abbeville county.⁶² The growth in Georgia followed a similar pattern, although it was perhaps not as great.

In both states the Grange, together with the state agricultural societies, was instrumental in securing the establishment of state departments of agriculture. It was successful on a local scale in securing reductions in prices through cooperative purchase of fertilizer, flour, and cotton-baling material. Laws regulating railway rates were secured.⁶³ The Grange was given part of the credit for inducing Georgia farmers to reduce cotton acreage in 1874 and to increase their acreages in corn and wheat.⁶⁴

62. Patrons of Husbandry of South Carolina, Proceedings of the Third Session of the State Grange of the Patrons of Husbandry of South Carolina (Columbia, 1875), pp. 7-9.

63. Francis Simkins and Robert Woody, South Carolina During Reconstruction (Chapel Hill, N. C., 1932), pp. 259-260, 262-265; Georgia, Commissioner of Agriculture, Annual Report of Thomas P. Jones, Commissioner of Agriculture of the State of Georgia, for the Year 1875 ([Atlanta], 1876), pp. 137-143.

64. Anon., "Agricultural Improvement in Georgia," Amer. Farmer, n. s., v. 3 (December 1874), p. 406.

The Grange, however, could not cope with the continuing adverse economic conditions. After 1875 its period of militancy ceased, and it became associated with the more conservative state agricultural societies.

As farmer discontent mounted in the next 15 years, reforms in agricultural organization and education were pressed more vigorously. In South Carolina the Tillman movement, developing concurrently with that of the Farmer's Alliance, was largely responsible for the establishment of a strong agricultural college and a corresponding women's college. Ben Tillman became an agrarian agitator after droughts in 1883, 1884, and 1885 had cut short the cotton crops on his Edgefield county farm and caused financial reverses. He blamed his difficulties on his own ignorance of the science of agriculture, and believed that other farmers suffered from the same lack of knowledge. He cried out against those who spoke of South Carolina's prosperity in the face of "land butchery by ignorant farmers and negroes." Largely through the efforts of Tillman and his followers, the legislature of 1886 established several experiment stations under the direction of the president of South Carolina College. Thomas Green Clemson, son-in-law of John C. Calhoun, bequeathed the Calhoun home, Fort Hill, and a cash endowment of \$80,000 to the state for an agricultural school upon his death in 1888. Influenced by Tillman, the legislature implemented this bequest by establishing Clemson Agricultural College at Fort Hill.⁶⁵

65. Francis Simkins, The Tillman Movement in South Carolina

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... and a cash endowment of \$10,000 in the
... for an agricultural school upon his death in 1885. Little

The agrarian movement of the last three decades of the nineteenth century thus brought forth a new type of political leader, as represented by Ben Tillman and Tom Watson of Georgia,⁶⁶ and it strengthened the public agencies concerned with protecting the farmer's interests and making him technically more proficient.

The handbooks put out by the state departments of agriculture in an attempt to attract immigrants did not accomplish their primary objective, although many of the earlier ones represented a tremendous amount of work and are now highly valuable to the historian. Attempts at effective railway regulation by the states languished. The state departments nevertheless performed, and still perform, useful routine functions, the most notable probably being the inspection of fertilizers. The state experiment stations and agricultural colleges were at first handicapped by the lack of a ready-made body of scientific agricultural knowledge applicable to local conditions. They were forced to assemble and test their data on rotations, fertilization, terracing, and other subjects at the same time that they were imparting this information to the students and farmers. In the beginning the colleges and experiment stations relied rather heavily on established farmer practice, including the personal experience of

(Durham, N. C., 1926), pp. 51-100; See also Francis B. Simkins, Pitchfork Ben Tillman, South Carolinian (Baton Rouge, La., 1944).

⁶⁶ See C. Vann Woodward, Tom Watson, Agrarian Rebel (New York, 1938).

their teachers and writers, even though this might not have been tested by experiment. In time the stations were able to speak with greater scientific authority. Through farmers' institutes, county demonstration agents, and finally through the public schools the work of the experiment stations reached an ever-widening body of farmers.⁶⁷

Boll Weevil, Depression, and After

By 1914 the boll weevil had spread across most of the Gulf states, lowering cotton production temporarily in the most recently infested areas. This, together with the agricultural prosperity generated by the first World War, led to considerable expansion of cotton in the seaboard states. A land boom was created by farmers buying tracts for cotton production. Fertilizer and equipment were purchased at inflated wartime prices. Tenants paid inflated rents and purchased work stock and provisions on "time". The lands of the owners and the mules of the tenants were placed under mortgage. Even with the weevil on the western border of Georgia there were hopes of making "just one more large crop," and in many quarters the fond illusion was cherished that areas in the Piedmont, because of their altitude,

67. This aspect of the subject is treated in more detail in Chapter IV. The development of farm terracing, discussed in Chapter VII, offers an example of the way in which techniques already developed by farmers were at first taken over and publicised by the stations, and later improved upon after experimentation and field testing.

or some other quality, were immune from weevil infestation.⁶⁸

Spreading upward across Georgia, the weevils reached South Carolina by 1917 and the northern limits of cotton production after 1921. Their progress was more rapid in the Coastal Plain and lower Piedmont than in areas adjacent to the mountains. In the midst of this calamity the war boom came to a close. The price of cotton dropped from 38 cents in 1919 to 17 cents in 1920. The crops of 1920 and 1921, planted at great expense on land bought or rented at inflated values, were sold at a loss, and in areas newly infested by the weevil this loss was compounded because of the falling off from the normal crop. Thus, in Greene county, Georgia the cotton ginnings for 1919 were 20,030 bales, the greatest number since 1911. The boll weevil had first appeared in the county in 1916, but his depredations were not severe until 1921. The 1920 ginnings were 13,414 bales, but those of 1921 only 1,487 bales. This left both landlords and tenants in a bankrupt condition. By 1922 the confidence of farm operators had vanished. Because of small plantings and continued severe weevil damage, the crop that year amounted to only 333 bales.⁶⁹ The progress of weevil damage can be traced in Tables No. 9 and 10. The acreage and production of cotton in Georgia declined sharply in the period 1915-1919 from the averages of the previous five-year period. Even greater losses were recorded in

68.O. M. Johnson and Howard A. Turner, The Old Plantation Piedmont Cotton Belt, U.S.D.A., Bureau of Agricultural Economics, mimeographed (Washington, 1930), p. 20.

69.Raper, Preface to Peasantry, pp. 201-206.

1920-24, when the post-war depression added its weight to weevil damage, but in the period 1925-1929 there was a partial recovery. In South Carolina the losses in 1915-1919 were not so great as in Georgia, although severe in the next half-decade. The progress of the weevil to the south and east had a tendency to push cotton production northward and to higher altitudes, as shown in the increased production of North Carolina and Virginia. Similarly, ginner's reports in South Carolina indicated a decrease of about 76 thousand bales from 1920 to 1921 in nine lower Piedmont counties, as opposed to an increase of about 62 thousand bales in nine upper counties.⁷⁰

Table No. 9

Cotton Acreage: Yearly Average,
1910-1929
(Thousands of acres)

| | <u>1910-1914</u> | <u>1915-1919</u> | <u>1920-1924</u> | <u>1925-1929</u> |
|----------------|------------------|------------------|------------------|------------------|
| Virginia | 43 | 42 | 61 | 85 |
| North Carolina | 1,550 | 1,468 | 1,660 | 1,894 |
| South Carolina | 2,736 | 2,794 | 2,363 | 2,447 |
| Georgia | 5,293 | 5,172 | 3,791 | 3,690 |

Source: Agriculture Yearbooks.

⁷⁰Anon., "Ginner's Report Below Last Year," Herald and News (Newberry, S. C.), Nov. 22, 1921, p. 2.

1950-51. The total value of exports was \$1,000 million, and the total value of imports was \$1,000 million. The balance of trade was in surplus by \$100 million. The total value of exports was \$1,000 million, and the total value of imports was \$1,000 million. The balance of trade was in surplus by \$100 million.

(Continued on next page)

| Exports | Imports | Balance | Total |
|---------|---------|---------|-------|
| 1,000 | 1,000 | 100 | 2,000 |
| 1,000 | 1,000 | 100 | 2,000 |
| 1,000 | 1,000 | 100 | 2,000 |

Table No. 10

Cotton Production: Yearly Average,
1910-1929
(Thousands of 500 lb. bales)

| | <u>1910-1914</u> | <u>1915-1919</u> | <u>1920-1924</u> | <u>1925-1929</u> |
|----------------|------------------|------------------|------------------|------------------|
| Virginia | 23 | 22 | 31 | 45 |
| North Carolina | 874 | 740 | 880 | 952 |
| South Carolina | 1,381 | 1,260 | 890 | 837 |
| Georgia | 2,270 | 1,879 | 901 | 1,227 |

Source: Agriculture Yearbooks.

The areas of large landholdings, high proportion of tenancy and cropping, and greatest dependence on the cash crop were most adversely affected by the weevil and the depression. These were precisely the old plantation areas which had been least able to withstand vicissitudes of fortune in the past--western competition and depression in the 1830's and 1840's, readjustment to free labor after the Civil War, and the long depression from 1870 to 1900. Continued townward migration by owners and abandonment of worn out land by laborers had by 1920 resulted in increasing control of the actual farming operations by the town merchants on the one hand, and continued idleness of much of the land on the other. The dependence of the tenants on the merchant had been greatly increased. The payment of a standing cotton rent had also become more important, and the share rent less so.

In 1920 the tenants were unable to meet either their rents or their debts for supplies. Landowners were unable to meet mortgage payments or fertilizer bills. Unable to collect their debts, merchants were forced to give up the supply business. In the two or three following years efforts to regain losses by further cotton cultivation only resulted in greater failure and mounting debt.⁷¹ Many resident owners made only enough corn, pork, and molasses to keep them from starvation, but no cotton with which to pay debts or form a reserve to start a new crop.⁷²

Unable to find employment, and with their work stock taken for debt, the laborers abandoned the region in large numbers. The exodus was stimulated by opportunities in the northern cities after the immigration laws passed in the early 1920's had created a vacuum in the cheap labor market. The total rural population of the Cotton Plantation Area decreased from 681,060 in 1920 to 550,321 in 1930 (Appendix No. II, Table No. 5a), most of this decline being accounted for by the migration of colored farm laborers and their families. The outward movement of the colored population which had been going on for some decades was greatly intensified. In five plantation counties of South Carolina, for instance, there was a decline of one percent in the colored population between 1900 and 1920, but a decline of 19 percent between

71. Johnson and Turner, op. cit., pp. 11, 20-21; Raper, Preface to Peasantry, p. 205.

72. Anon., "Tenants Unable to Pay Rent," by J. H. C., Herald and News (Newberry, S. C.), Oct. 25, 1921, p. 1.

the fact that the population of the island was small and that the island was not a part of the country.

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The island was a fertile plain. Unable to collect water.

1920 and 1930. At the same time the white population of these counties increased 36 percent in the first period and 17 percent in the second. For the first time in about a century a few plantation counties had white majorities. The colored population of the Cotton Farming Area also decreased somewhat.

Many of the banks were forced to close. Even those that continued solvent gave up the business of production loans to farmers, and merchants would take liens from tenants only if the landlord would waive his rights to rent. Absentee land owners allowed the land to lie out of cultivation rather than attempt such a losing business. In other cases landlords turned the land over to the tenants for such use as they could get out of it for food or cash crop production, the tenants giving whatever they were able or inclined to pay for rent. Much of the land was sold for taxes, and mortgages were foreclosed on much more. In Greene county, Georgia which had farm land totaling 196,000 acres in 1920, over 15,000 acres had been sold for taxes by 1927. Such land might occasionally be redeemed by the former owner upon the payment of back taxes and interest, or it might be farmed by the new owner.

Large acreages that passed into the hands of local banks, life insurance companies, and other investment companies, as a result of foreclosure, were generally allowed to lie uncultivated. The banks and the non-resident companies endeavored to dispose of their unwanted broad acres, but on the whole they continued to be unwilling owners. In Greene county about 13,000 acres of some of the best land had passed into the hands of loan companies by 1927

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and 17,000 acres by 1934, and a large eastern life insurance company was not only the county's largest land holder, but just about its most reliable tax payer.⁷³ Although such developments were spectacular, the total holdings by loan companies were not believed to be large in comparison with the aggregate area. According to one estimate the total amount of land held by the companies in the entire cotton Piedmont was about equal to one fair-sized county.⁷⁴ The companies had equities in large additional acreages still held more or less nominally by private owners. Land held in large tracts and farmed by tenants was more likely to suffer foreclosure than land of the resident farm owner.

Such were the economic factors causing the weevil invasion to be felt more seriously in the Plantation Area than in the Cotton Farming Area. Physical factors were not without influence, also. Weevil infestation appears to be more severe, on the average, in the Plantation Area counties than in the upper Piedmont of Georgia and South Carolina and in central North Carolina. The higher altitude and latitude of the latter areas may play a part in this. Probably more important is the fact that a greater amount of waste land is found in the lower Piedmont than in the upper. The weevil feeds on the cotton squares and bolls during the summer, producing several generations during this season. The last generation of the season retires to hibernate during the

73.Raper, Preface to Peasantry, pp. 212-213, 232. Information on property losses as a result of the boll weevil was also secured from Mr. Norman Palmer, banker, of Ridgeway, South Carolina.

74.Johnson and Turner, op. cit., p. 19.

winter in whatever cover it can find, whether cotton stalks, broom sedge, or pine woods. If the winters are mild and if the fields are small, with timber or grass-covered wasteland nearby, a high percentage of the weevils survives to emerge and start feeding on the next cotton crop. Conversely, if the winters are comparatively severe and if the fields are large, affording little protective cover, most of the weevils are destroyed before spring. "Patch farming" is no longer possible for the cotton producer under boll weevil conditions, as one farmer of long experience pointed out to the author.⁷⁵ The slate soils, with their large expanses of woodland are located exclusively in the lower Piedmont, and there are also extensive tracts of waste black jack land or other rough, gullied, and abandoned land. The remaining fields in such areas are likely to be comparatively small. In the upper Piedmont the proportion of waste land is smaller and the fields are generally larger.

For the overworked soil the weevil invasion was not without its compensations. The annual shallow plowing, the clean cultivation of row crops in summer, and the recurrent exposure of almost bare surfaces in winter; the repeated doping of the land with the ephemeral fertilizer, but equally repeated failure to return the preserving humus to the soil--all of this ceased on lands where cotton culture was no longer profitable. These lands were retired, to be covered in one or two seasons by weeds and

75.Mr. T. M. Mills, formerly county agent of Newberry County, S.C.

broomsedge, and within a few years by the ubiquitous pines. Between 1919 and 1924 there was a decrease of about 29 percent in the harvested crop acreage in the cotton Piedmont, and in the Plantation Area the decrease in all improved land from 1919 to 1929 amounted to 13 percent. Having in mind the former constant pressure on the land to produce cotton, and the poverty and insecurity of the average cotton farmer, some producers and business men welcomed the pest. One of this school exclaimed in 1922:

Millions of near-paupered, a few thousand rich men ... and one of the poorest but best countries on the face of the earth ... Tens of thousands of acres of our beautiful South land washed into gullies ... The weevils have already filled some gullies and I hope they will prevent the making of any more.⁷⁶

The land could not remain unused, however, if people were to continue to live in the region, nor could prosperity be created in a vacuum left by a vanished cotton industry. In desperation farmers turned to short-lived expedients. These were in some cases as damaging to the land as cotton raising. Rabbits multiplied in the growing sedge and brush, and for a time the trapping and sale of their skins brought in some cash.⁷⁷ The lumbering industry sprang up in many areas. Land which had been abandoned and not recleared in the period 1870-1900 now supported useable saw timber, and saw milling was one of the principal enterprises

76.F. A. Nunnery, "Edgemoor Farmer Welcomes Weevil," The State (Columbia, S. C.), Oct. 1, 1922, p. 17.

77.Raper, Preface to Peasantry, pp. 211-212.

...the average cotton farmer, and business ... one of this small ...

... of their skins brought in some cash. TT

in such areas for a few years, until the saleable timber supply was exhausted. During the depression of the 1930's a new type of forest exploitation sprang up, furnishing a livelihood of sorts to displaced farm laborers. Paper pulp mills were built at Charlotte, North Carolina and Georgetown and Charleston, South Carolina using cuttings of small pine or other scrub timber from the surrounding region as raw material. Land abandoned during the early boll weevil depression supported trees large enough for pulp wood by this time. The old cycle of clearing, cultivation, abandonment, reforestation, and reclearing thus continued, although now it took a somewhat different form. In former times most of the clearing had been done to make fields. In the early 1920's, more fields were abandoned than were cleared. At the same time, however, land was cleared of its larger pine for lumber. In the 1930's the fields abandoned during the early boll weevil period were recleared, not for cultivation, but for pulp wood.

Business men, state experiment station officials, extension workers, and large farmers, seeking to reconstruct agriculture on a permanent basis during the boll weevil crisis, once more, as in times past, urged the raising of home supplies and curtailment of the cotton acreage, the introduction of peanut culture, dairy farming, hog raising, and other specialties. More conservative men believed, on the other hand, that cotton would continue to form the basis of the farming system, and proposed

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measures for combating the weevil successfully.⁷⁸

The small farmer and tenant, while anxious in many instances to get out of the toils of the all-cotton system, had no capital to invest in animal industries. If he did raise his own supplies and have surplus hogs or other products for sale, he found little profit in these enterprises and was still forced to depend upon cotton for most of his cash. One of these small farmers suggested pointedly that landlords and business men should give less good advice and help the small farmer in more constructive ways. He asserted that the farmers of the nearby countryside and the city council of Columbia, South Carolina should cooperate in the building of a market for the sale of local produce.⁷⁹

In the long run the more conservative advice prevailed. There were some farmers who stubbornly continued to make cotton in the traditional way their success being based, to all appearances, entirely on the assistance of Divine Providence. Others adopted stalk destruction to do away with the weevil's fall food supply, heavier fertilization with better grades of fertilizers to rush the crop to maturity before the late summer weevils could damage it, better tillage to keep down weeds and grass, and "mopping"

78.D. H. Coker, "Outline Program to Meet the Weevil," Herald and News (Newberry, S. C.), Nov. 4, 1921, p. 3.

79.George W. Thomas, "Too Much Advice Offered Farmers," Herald and News (Newberry, S. C.), Dec. 2, 1921, p. 3; Anon., "Fairfield County News as Reported by Correspondents," Fairfield News and Herald (Winnsboro, S. C.), Sept. 16, 1921, p. 1.

with a solution of calcium arsenate to kill the weevils. More frequent use was made of cover crops and green manures to build up reserves of fertility, and greater amounts of grain and other general food crops were raised. In this way a partial recovery was made in the cotton crop, although the cotton acreage in relation to other crops was smaller.

As confidence returned, credit was available again, much of it by this time, however, from the Federal Land Banks and other forms of government lending. The share rent required of tenants was reduced in many cases. On the other hand, many former tenants who remained in the region had already been obliged to become croppers or day laborers. The trend toward employment of day labor increased in some sections during the depression of the 1930's, but predictions at that time that tenancy in the sick cotton industry would disappear seem to have been premature.⁸⁰

The farmers attempting other specialties were confronted with the basic factor of the smaller cash return from these products in comparison with that from cotton in its heyday. Immediately after the appearance of the boll weevil there was a widespread attempt to raise peanuts on a large scale in the Georgia Piedmont. Some farmers lost, in this attempt, the little capital that they had left from the 1920 crash. By 1924 the peanut acreage in 16 Georgia counties had risen to 47,000 acres, but it declined rapidly to 6,000 by three years later.⁸¹ Dairying and the

80. Charles S. Johnson, Edwin R. Embree, W. W. Alexander, The Collapse of Cotton Tenancy (Chapel Hill, N. C., 1935), pp. 35 ff.

81. Johnson and Turner, op. cit., p. 26.

sale of milk or sour cream to cities such as Atlanta met with some success, although the fluctuations in the market and the initial outlay for a dairy herd limited the possibilities from this endeavor. Large scale dairying also requires a type of daily and seasonal farm regime radically different from that to which the cotton farmer was accustomed. The supplying of mill towns with truck, poultry products, and dairy products was developed to some extent, but many mill villagers kept gardens and poultry of their own.⁸² By the decade of the 1930's the presence of mill towns had influenced the surrounding countryside in another way. Mill workers bought or rented land within commuting distance of the town and farmed it on a part-time basis. Sometimes one or more members of the family worked in the mill while others stayed home to do the farming. These types of farms were often in submarginal land areas.⁸³

Some of the most successful farming along lines other than cotton was practiced in areas with a tradition of general farming before the boll weevil arrived. Such an area was the Dutch Fork above Columbia, South Carolina. The people here were descended from German settlers of colonial times, and during the slavery period they had remained outside the main currents of

82. Ibid., p. 27.

83. R. H. Allen, L. S. Cottrell, Jr., W. W. Troxell, Harriett L. Herring, and A. D. Edwards, Part Time Farming in the Southeast. Works Progress Administration Research Monograph IX (Washington, 1937), pp. 94-102.

South Carolina life because they were small, live-at-home farmers producing little cotton. The growth of Columbia furnished a market for their surplus poultry, eggs, and vegetables and made their diversified enterprises profitable. By the 1930's the Columbia produce market envisaged by the critic of 1922 had been built and was one of the most successful of its kind in the southeast. A few farmers in Putnam county, Georgia had for years maintained herds of Jersey cattle. After the coming of the weevil these farmers helped to diffuse dairy stock throughout this part of the state.

Peach orchards became fairly successful in parts of Georgia and South Carolina. In Spartanburg county, South Carolina, the first large shipments of peaches were made in 1924, and the annual crop by 1939 was 963,967 bushels. Watermelons, pimiento peppers and pecans are other crops that attained some local significance.⁸⁴

The coming of the depression of the 1930's forced an even greater reduction in cotton production. With the assistance of different Federal agencies, farmers of the region were able to go even further into the production of diversified crops and animal products, and at the same time retire eroded land to pasture or planted woods. Table No. 11, showing acreages devoted to different crops or types of land use for five typical Georgia counties at recent census periods, illustrates the extent to which

⁸⁴.Johnson and Turner, op. cit., p. 27.

of the course.

These animals became fairly successful in parts of Georgia and South Carolina. In 1924, the first shipment of hares was made in 1924, and the first crop by 1925 was 307,500 bushels. Watermelons, pineapples, and other crops that attained some local significance.

The study of the depression of the 1930's forced an even greater reduction in cotton production. With the assistance of different Federal agencies, farmers of the nation were able to go even further into the production of diversified crops and animals.

grains, hay, annual legumes, and pasture have increased in importance in relation to cotton. In 1944 the value of cotton and cotton seed amounted to only 42 percent of the total value of important crops harvested in nine typical Georgia and North Carolina counties. Thus, the region has made great progress toward general farming. With continued urbanization this trend may continue. Without some unforeseen change, however, it is difficult to see how cotton can cease to occupy a very important place in the farming of the Piedmont.⁸⁵

⁸⁵See also Slentz, Helen I. (Milton), Recent Trend Toward Diversified Farming in Southern Cotton Areas. Resettlement Adm., Land Utilization Div., Land-Use Planning Publication No. 17 (Washington, 1937).

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Table No. 11
Acreage in selected crops or land use
Six Georgia Counties

| | <u>1934</u> | <u>1939</u> |
|--|-------------|-------------|
| Cotton | 85,353 | 66,359 |
| Corn ¹ | 144,913 | 126,212 |
| Small grains ² | 33,020 | 31,209 |
| All hay | 23,996 | 26,755 |
| Flowable pasture | 77,688 | 113,641 |
| Potatoes ³ | 6,936 | 5,322 |
| Annual legumes ⁴ | 16,376 | 26,306 |
| Vegetables for sale | 4,912 | 3,722 |
| Tree fruits, nuts,
vineyards ⁵ | 8,782 | 9,864 |

1.Corn for all purposes.

2.Oats (incl. cut and fed unthreshed), barley, rye, wheat.

3.Irish and sweet.

4.Grown alone--soybeans, cowpeas, peanuts, vetches, velvetbeans, mung, and horse beans, etc.

5.Excludes nurseries. (Data for 1935 and 1940)

Chapter VII

HISTORY OF TERRACING IN THE SOUTHERN PIEDMONT

Introduction

Terraced farms are a characteristic feature of the landscape of the Southern Piedmont. This is especially true in the cotton areas. One finds stair-stepped fields where fairly steep land is still cultivated in the traditional manner, or modern drainage-type, broad base terraces on land that is more gently rolling. In some places even the hillside ditch, the ancestor of the present terrace, is still in use. Terracing and related methods for controlling the flow of water over cultivated land are quite venerable in foreign countries, but the methods employed in the southeastern United States are indigenous to the region, having been developed by trial, error, and experimentation there, with practically no borrowings from foreign practice.

Much of the early work in contour plowing, hillside ditching, and terracing in this country was done in the Southern Piedmont.

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These techniques represent distinctive contributions to the art of agriculture on the part of the region. Vegetative methods of erosion control, such as the plowing under of legumes, alternation of winter cover crops with summer row crops, and strip cropping have been used in the Piedmont, and within recent decades they have been successful. Throughout much of the history of the region, however, vegetative methods on a large scale were not suitable because the existing economy required the cultivation of large acreages of row crops and only comparatively small acreages of close-growing crops. Terracing and the other mechanical methods were adaptations to existing economic and physical conditions. They represented attempts to control erosion and simplify the task of cultivation in hilly country where much of the tilled land was in row crops.

Critics of the Southern farmer, when berating him because of his backward, wasteful methods, often assumed that all would be well if he would only decrease or abandon his crops of cotton or tobacco in favor of wheat, oats, and grasses, forgetting that he operated under a given set of physical and economic conditions which almost precluded such a change. They also overlooked the fact that by developing terrace systems he did try (howbeit unsuccessfully in many instances) to adopt conservation methods of farming under conditions as they existed. Because so much work in terracing was done in the Southern Piedmont, the present writer believes that this somewhat neglected phase of Southern agricultural history should have a place in the present study. The earlier stages in the development of terracing--the practices

of contour plowing and hillside ditching--are touched upon only briefly, since they have previously been discussed in more detail in two Department of Agriculture Miscellaneous Bulletins.¹

Horizontal Plowing

Plowing with the small, one-horse shovel plow of the early nineteenth century was a laborious operation on the undulating Piedmont fields. Rows were generally laid out in straight lines and were crossed, or checked, by another set of rows at right angles to the first. If rows lay up and down the slope the work was difficult for man and beast, and as a result the soil was often barely scratched. The water from summer showers was carried off rapidly down the straight furrows, taking the shallow layer of loose soil with it, and leaving the field parched and drought-stricken during the succeeding dry spells. Plowing at an angle to the direction of the slope, or along the contour, was adopted in order to make the work more efficient and to conserve soil and moisture.

Some farmers in the Tidewater area of Virginia had abandoned cross plowing in favor of "horizontal" (contoured) furrows in the late eighteenth century. The practice of contouring was known also in Maryland, Pennsylvania, and perhaps elsewhere by the

1. Hall, Story of Soil Conservation in South Carolina Piedmont; A. R. Hall, Early Erosion Control Practices in Virginia, U.S.D.A. Misc. Publ. No. 256 [Washington, D. C., 1937].

of contour farming and similar systems—on contour and on
slopes, where they have been found to be of great
value in the Department of Agriculture, Washington, D. C.

Contour Farming

Working with the soil, one-horse shovel plow of the early
nineteenth century was a laborious operation on the undulating
farms of the East. Rows were generally laid out in straight lines
and were uneven, or checked, by another set of rows at right
angles to the first. If rows lay up and down the slope the water
was naturally for man and beast, and as a result the soil was
often badly scratched. The water from summer showers was con-
stantly running down the straight furrows, taking the shallow
layer of loose soil with it, and leaving the field parched and
barren. During the summer months the succeeding crop suffers. Flowing at
an angle to the direction of the slope, or along the contour, was
designed to make the work more efficient and to conserve
soil and moisture.

Good results in the Tidewater area of Virginia had been
achieved by the use of "terraces" (contour farming) for many
years. The practice of contouring was known
also in Maryland, Pennsylvania, and perhaps elsewhere by the

beginning of the nineteenth century. Thomas M. Randolph of Albemarle County, in the Virginia Piedmont, first attempted horizontal plowing in 1793, and in 1808 designed a hillside plow with a shifting moldboard and share that would turn the furrow slice downhill in going either direction across the face of the hill. His father-in-law, Thomas Jefferson, was at first skeptical of the new method of plowing, but later became enthusiastic and gave the method and the plow wide publicity in his voluminous correspondence. Friends as far away as the Mississippi Territory were induced to try horizontal plowing. Other Virginia inventors made improvements in the hillside plow.

Randolph's method was to lay off guide rows on the contour thirty feet apart. For a corn field, intermediate rows were laid off parallel to these by eye, six feet apart, and bedded up so that a generous water furrow was left between each row. The levelling instrument used quite widely throughout the southeast to lay off the guide rows was the rafter level, or "A" frame. It consisted of two lengths of board fastened together at their ends to form an acute angle and a bracing cross piece, giving the whole the appearance of a capital A. The distance between the two legs at the bottom was from 10 to 16 feet. A plumb line was suspended from the apex and the cross piece was graduated in such a way that the variation of the plumb line from the perpendicular could be noted. The instrument was stepped across the field by swinging it from one leg to the other. If a row exactly on the contour was desired, care was taken that the plumb line should fall exactly on the perpendicular mark of the cross piece with

every step. The plow then followed the line marked off by the rafter level.

Horizontal plowing was practiced by some farmers in the South Carolina Piedmont by about 1815 or 1820. Certainly by 1830 it was familiar to quite a number of farmers in the Southern Piedmont.² In the first flush of enthusiasm some practitioners believed that it would completely solve the erosion and water conservation problems, but those who continued to plow fields on the contour for a number of years came to realize that exactly horizontal crop rows did not have the capacity to hold the more intensive rains of summer. The method used by Jefferson and Randolph was modified in some instances by giving a slight fall to the crop rows so that the water would drain into some convenient natural draw or small gully. Other farmers, after plowing on the contour, cultivated in such a way that the land was left flat, without water furrows, on the theory that the water would pass over it in a sheet and would not collect at any point to form a gully.³ Much of the supposed inadequacy of horizontal plowing seems to have been due to improper execution, for many farmers did not lay off rows by instrument, but relied solely on eye or instinct to guide the plow around the circuitous contour

2. William Ellison, "On Horizontal Ploughing," Sou. Agri. (Charleston), 1st ser., v. 3 (April, 1830), pp. 178-182; Anon., "On the Benefits Arising from Horizontal Plowing and Ditching," by A Highlander, Sou. Agri. (Charleston), 1st ser., v. 4 (June, 1831), pp. 301-303.

3. Ellison, loc. cit.

very high. The high level of the water was not at all unusual.

Experimental planting was conducted on the island in the summer of 1935. The results of the experiment were as follows: The first trial of planting was conducted on the island in the summer of 1935. The results of the experiment were as follows: The first trial of planting was conducted on the island in the summer of 1935. The results of the experiment were as follows:

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of the hill. In Albemarle and other counties of the northern Virginia Piedmont horizontal plowing was eventually abandoned to a large extent. The cultivation of clover and the grasses, and rotation of clover with corn furnished a cover crop and made contouring less necessary.

Hillside Ditching

In the tobacco and cotton areas of Southside Virginia, the Carolinas, and Georgia clean cultivation, shallow plowing, and lack of rotation remained the rule. It was found that not only must contour plowing be adopted, but it must be supplemented or modified by the use of hillside ditches to receive the excessive water and carry it off gradually. Hillside ditches were used in Virginia as early as 1813. By 1830 they were to be found in various places throughout the Piedmont. Early systems of hillside ditches consisted of U-shaped gutters about 3 feet wide and 2 feet deep laid out with the rafter level and excavated with spades. They were inclined each way from the center of the hillside field into the nearest convenient ravine on either side of the field. The excavated dirt formed an embankment on the lower side of the ditch. The ditches were placed 20, 50, or 100 yards apart according to the steepness of the slope. Such a system of ditches divided the field into several small strips and the difficulty of passing wagons or plows over the ditches was considerable. To resolve this difficulty it was found desirable to make

the ditches with plow and hoes instead of spades, forming a gently concave ditch about three feet wide and a rounded embankment of about the same width on its lower side.

The specifications as to size, length, grade, and spacing of hillside ditches varied widely as the practice came more into vogue. Some farmers made rather small hillside ditches, especially on light sandy or loamy soils, and in time these were called guard drains. In parts of South Carolina, however, the term guard drain was used for all hillside ditches. The grades of the ditches, that is, their rate of descent down hill, ranged from 8 inches to about 35 inches per 100 feet. Experienced makers of hillside ditches did not attempt to make them more than 300 yards long.

The problem of outlets for the hillside ditches was always a serious one, for if the water was not properly controlled at these points the whole system would prove ineffective. If possible, the ditches were sometimes emptied into a small branch or creek, and they were graded in a direction opposite to that of the natural fall of the branch, on the theory that this would slacken the velocity of the water. If it was necessary to make a ditch directly down hill to receive water from several hillside ditches, this center ditch was sometimes paved on the bottom with stone, or was sown in grass and clover, forming what today would be called a meadow strip. Gullies or natural depressions in the field that were used to receive water from hillside ditches were sometimes treated in the same way. Far too many farmers, however, simply emptied their ditches into the nearest convenient fence

[illegible]

row, road, or raw gully, and in time discovered that more harm than good was being done by their hillside ditches.

The manner in which hillside ditching and horizontal plowing should be combined was the theme of lively controversy. Some farmers contended that the crop rows should be laid off exactly on the contour and thus empty their surplus water into the graded ditches. Others advocated that crop rows should be parallel to and maintain the same grade as the hillside ditches.

By the decade before the Civil War considerable progress had been made in evolving principles of construction and maintenance of hillside ditches, based on the experience of practical planters and farmers. Several writers had written comprehensive essays on the methods. As a result of an essay contest conducted by the North Carolina State Agricultural Society in 1857, Nicholas T. Sorsby, M.D., a resident of Alabama, but native of North Carolina, wrote the prize-winning treatise, "An Essay on Horizontal Plowing and Hill-Side Ditching." He gave a brief history of these methods of erosion control in this country and outlined the various ways in which contour cultivation and ditching might be combined to accommodate differing situations of soil texture, slope, and type of crop raised. He thus attempted to synthesize the different and apparently conflicting systems of hillside ditching and horizontal plowing. The publication included field diagrams and tables. It was perhaps the most pretentious treatise on the subject of hill-ditching. Other prominent writers on the subject were D. Wyatt Aiken, later prominent in the Grange, and Congressman from South Carolina, Nelson Clayton

of Georgia, J. W. Norwood of North Carolina, and R. S. Hardwick of Georgia.⁴ The significance of Sorsby's essay was that it presented a comprehensive picture of practices then in use based on the experience and observation of one careful planter.

Development of Horizontal Bench Terraces

Following the Civil War the practice of hillside ditching continued to be widespread, and seems to have increased in popularity in the cotton areas. The realization was growing, nevertheless, that it was not the final answer to the problem of erosion control by mechanical means. Even the advocates of hillside ditching admitted that it often created more gullies than it prevented, but proponents generally attributed this to improper construction or maintenance.⁵

4. Nicholas T. Sorsby, "An Essay on Horizontal Ploughing and Hill-Side Ditching," in North Carolina Agricultural Society, Transactions, 1857, pp. 33-68; J. W. Norwood, "Letters on Horizontal Ploughing and Hill Side Ditching," in loc. cit., pp. 85-92; D. Wyatt Aiken, "A Practical Paper Upon Grading, Ditching and Improving Land," in South Carolina State Agricultural Society, Transactions, 1858-59, pp. 77-90; Nelson Clayton, "Premium Essay on Hill-Side Ditching. Read before the Second Annual Fair of the Georgia and Alabama Agricultural Society," Sou. Cult., 1st ser., v. 11 (Feb. 1853), pp. 41-42; R. S. Hardwick, "Mr. Hardwick's System of Hillside Ditching," Sou. Cult., 1st ser., v. 9 (May 1847), pp. 68-69; R. S. Hardwick, "Hillside Ditching," Southern Farm and Home, v. 1 (Nov. 1869), pp. 5-9.

5. Anon., "Hill-Side Ditches," by A. H. S., Carolina Farmer, v. 1 (May 1869), pp. 208; Anon., "Hill-Side Ditching, etc.," by J., Sou. Cult., 1st ser., v. 29 (June 1871), pp. 208-209.

as the experience and observation of one careful glazer.

Development of Horticultural Bench Technology

provisional, but proponents generally attributed this to improper

1. "The Great Wall of China" by ...
 2. "The Great Wall of China" by ...
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 8. "The Great Wall of China" by ...
 9. "The Great Wall of China" by ...
 10. "The Great Wall of China" by ...

1. Name, "Willie Mae Brown", by A. M. Brown, 1900.
2. Date, "1900", by A. M. Brown, 1900.
3. Place, "New York", by A. M. Brown, 1900.
4. Author, "A. M. Brown", by A. M. Brown, 1900.

The principal objections to the system fall into about three categories. First, the hillside ditch was too narrow to hold the water from the most intense thundershowers if laid on a gentle grade, but if graded sufficiently to carry off the water the ditch eroded. Thus, although the ditch might prevent gullies directly down the hill, it might cause one to be formed obliquely across the hill. The soil of the field was not held in place by the ditch, but might run out through the ditch almost as rapidly as down a crop row. Second, because of the increasing use of commercial fertilizer, some method was needed to prevent that expensive material from running off of the hill lands with the first rain. Hillside ditches were useless for this purpose. Third, the generally neglected and run-down appearance of plantations in the Southeast, due in part to the general practices of Southern agriculture, and in part to the unsettled conditions of Civil War and Reconstruction times, perhaps caused hillside ditching to appear to be more harmful than it really was. One writer now saw fit to blame hillside ditching with precisely the same baneful results that in the early decades of the century had been laid at the door of shallow plowing and straight rows.⁶

Occasionally there were to be found men in the cotton region

6. Anon., "How to Prevent Washes," by Pontifex, Southern Farm and Home, v. 2 (Jan. 1871), pp. 89-90; Anon., "How to Recover and Preserve Hill Lands," Rural Carolinian, v. 2 (April 1871), pp. 401-402; Anon., "More About Hill-Side Hedging," Fairfield Herald (Winnsboro, S. C.), June 14, 1871, p. 2.

[illegible]

who practiced general farming and who found it possible to abandon hillside ditching and at the same time preserve their land. They did this by horizontal and deep plowing, rotations that included small grains, legumes, grasses, and fallow, with a clean tilled crop on the land only about one year out of four. The general trend, however, was away from such practices. The cotton farmer was obliged to retain and develop mechanical erosion control devices.⁷

A group of related practices that we may designate collectively as hillside stripping or hillside hedging was adopted in some quarters as a substitute for, or supplement to hill-ditching. As early as the 1830's one farmer of Fairfield District, South Carolina had suggested that horizontal, uncleared strips be left across the slopes to catch the soil from above, and Richard Watts of Edgefield District in the same state had uncultivated strips just above his hillside ditches.⁸ Again in 1871 it was advocated in Fairfield that permanent contoured rows of logs or brush, or hedge rows should be made at intervals, parallel to the cotton rows, with ditches on the lower side. A Georgia farmer planted

7. Anon., "To Keep Lands from Washing," by S. C., Sou. Cult., 1st ser., v. 29 (April 1871), p. 129; see also an answer to this, maintaining the necessity for hill ditches: V. A. McGinty, "To Prevent Land from Washing," Sou. Cult., 1st ser., v. 29 (June 1871), pp. 218-219.

8. W. Ellison, "On Horizontal Ploughing," Sou. Agri. (Charleston), 1st ser., v. 3 (April 1830), pp. 178-182; Robert Watts, "On the Cotton and Pea Crop & Ploughing, &c.," Sou. Agri. (Charleston), 1st ser., v. 8 (1835), pp. 452-456.

China-berry trees to form his horizontal hedge rows.⁹ The system of hillside hedging was advocated for a number of years by the influential Southern Cultivator.

Rather wide publicity was given to the plan practiced by David Nickols of Georgia in the 1870's and 1880's. He made comparatively broad hillside ditches with gentle grade. In some places they were completely level. Above these he maintained a strip of clover, timothy, or herd's grass. The grass or clover in some spots spread over both the ditch and the bank below it. The hillside ditch and bank together were about six feet wide and the uncultivated strip was another six feet wide. Nickols was much more particular than most farmers regarding the outlets of his hillside ditches. He preferred never to discharge them into roads, fence rows, or raw gullies, as was so often the practice. Instead, he made a series of wooden check dams across dry natural depressions in the fields, and the ditches were discharged into these. Where active gullies were used as outlets, these were also check-dammed and filled with brush. The outlets were also equipped with tile underdrains in places.¹⁰

The structure now called the bench terrace was being developed contemporaneously with the various methods of hillside

9. Anon., "How to Preserve and Recover Hill Lands," Rural Carolinian, v. 2 (April 1871), pp. 401-402; Anon., "Fencing," by W., Sou. Cult., 1st ser., v. 28 (May 1870), p. 141.

10. David Nickols, Preservation and Protection of Cultivated Lands from Surface Washing: a New System of Hillside Ditching (Atlanta, 1883).

at all the places was advocated for a number of years by the
Department of the Interior.

Before this policy was adopted the following was the

policy of Georgia in the 1870's and 1880's. It was con-

servatively from all the places with some exceptions. In some
places they were completely level. Above these he maintained a
grade of about twenty, or more, feet. The grade of the
is also kept, spread over both the ditch and the bank below it.

The alluvial soil and the surface was level in some places
and somewhat high in some places. It was level in some places.

with some exceptions than most farmers regarding the surface of
the alluvial surface. He preferred never to discharge them into
the river, or to the Gulf, as was so often the practice.

Instead, he built a dam at some place and made it a
dam in the river, and the water was discharged into

the river. When water gullies were made in some places, some
also were made and filled with water. The water was also
discharged with the water in the river.

The attention now called the beach terrace was being developed
at some places with the water in the river.

U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.
Bull. 100, p. 100 (1870).
Bull. 100, p. 100 (1870).
Bull. 100, p. 100 (1870).

U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.
Bull. 100, p. 100 (1870).
Bull. 100, p. 100 (1870).
Bull. 100, p. 100 (1870).

stripping, and before long enjoyed a popularity far exceeding the latter. Bench terraces, when properly made, formed the hillside field into a series of steps. The bench terrace was accordingly a terrace in the true sense of the word, in contrast with the structure consisting primarily of waterway and rounded bank to which the term "terrace" was also applied.

When James Gregorie, an editor of the Southern Agriculturist of Charleston, first learned of horizontal plowing in 1829, he put forward the suggestion that this practice would not prevent damage from the heavier rains, and that hill land farmers would doubtless eventually adopt a system of terracing similar to that practiced in the hilly parts of Tuscany.¹¹ Unhappy experience at home rather than advice to learn from foreign examples, however, was the motivation behind the development of the bench terrace.

Although hillside ditching and contour plowing were less used in Virginia than in states to the south, certain Virginia farmers developed designs resembling those used in later terracing practice. Doubtless in many instances the narrow bank of the hillside ditch, being uncultivable, was allowed to grow up to weeds or grass, and if the ditch above were neglected this might serve as a barrier for dirt washed or plowed from above, thus in time building a bench terrace. Some farmers, such as William L. Booker of Amelia County, Virginia deliberately made a sod-covered

11. Eldred Simkins, loc. cit., including comment by editor.

the fact that the same is not true of the other two. The fact that the same is not true of the other two is a result of the fact that the same is not true of the other two.

Mr. James Gregory, an editor of the Northern California
at Livingston, first learned of horizontal blowing in 1882, he
and thought the suggestion that this practice would not improve
things from the heavier rains, and that hill land farmers would
benefit eventually from a course of blowing similar to that
practiced in the hilly parts of Texas. If unhappy experience of
some others had been advised to learn from foreign examples, however,
and the author's belief in the value of the practice.

[illegible]

County of Loudoun, Virginia

bank and plowed the land above downhill, filling up the ditch, in this way making a structure similar to a terrace. He apparently did not call it by this name, however.¹² Among the earlier farmers to use the term "terrace" was J. H. Cocke of Brems, Fluvanna County, Virginia. The purpose of Cocke's system was to convert the rolling upland fields into level surfaces that would retain and absorb rainfall and be as productive as the lowland meadows. He called his practice the "strictly horizontal broad terracing system." The structures were terraces in the true sense of the word, forming a series of steps on the face of the slope. They were laid out exactly on the contour, without fall from one end to the other, and had a level upper surface and a steep face. Cocke made his terraces for irrigation purposes. He seems to have practiced this system in the 1840's and 1850's.¹³

Just before the Civil War, a Mr. Bancroft of Athens, Georgia made terraces on the contour for his gardens. They were made with the aid of the hill side plow, shovel, and scraper. The upper surfaces sloped inward slightly toward the hill, and there was a small ditch at the base of the next terrace above to carry off excess water. Bancroft set fruit trees and strawberries on the outer edge of the terrace and planted vegetables on the inner

12. Executive Committee, Va. State Agri. Soc., "Graduated or Guard Ditches for Hillsides. Sketch of a Discussion at a Meeting of the Powhatan Farmer's Club," Sou. Planter, 1st ser., v. 14, (August 1854), pp. 225-231.

13. J. H. Cocke, Sr., An Essay on Agriculture (Brems Bluff, Fluvanna Co., Va., n.d.).

and placed the land above downhill, filling up the ditch.
 in this way making a staircase similar to a terrace. He
 called this the "step" and by this name, however.¹² Among the earliest
 farmers to use the term "terrace" was J. H. Cooke of Brown,
 Illinois County, Virginia. The purpose of Cooke's system was to
 convert the rolling upland fields into level surfaces that would
 retain and absorb rainfall and be as productive as the level
 surface. He called his practice the "artificially horizontal ground
 terrace system." The terrace system is the same
 at the end, forming a series of steps on the face of the slope.
 that were laid out exactly on the contour, without fall from one
 end to the other, and had a level top surface and a steep face.
 This was his terrace for irrigation purposes. He seems to
 have called this system in the 1850's and 1860's.¹³
 That is, the Civil War, a Mr. Hancock of Athens, Georgia
 made terraces on the contour for his garden. They were made with
 the side of the hill as the flow, shovel, and hoe. The upper
 terrace sloped inward slightly toward the hill, and there was
 a wall at the base of the next terrace so as to carry off
 excess water. Hancock set fruit trees and strawberries on the
 level side of the terrace and planted vegetables on the inner

¹² J. H. Cooke, "The Step System," *Report of the Agricultural Commission*, Vol. 2, State of Ill., 1850, "The Step System" or
 "The Step System for Hill Sides." Section of a Dissertation at a West-
 ern University, 1850, pp. 225-231.
¹³ J. H. Cooke, "The Step System," *Report of the Agricultural Commission*, Vol. 2, State of Ill., 1850, "The Step System" or
 "The Step System for Hill Sides." Section of a Dissertation at a West-
 ern University, 1850, pp. 225-231.

space.¹⁴ Even as late as 1870 it was believed in some quarters that the making of true terraces was too expensive except for gardens.

In the late 1860's and early 1870's certain farmers in Georgia, South Carolina, and perhaps elsewhere commenced to terrace their land. One Georgia practice was to lay off a ditch or waterway about three feet wide on an exact contour with a bank above the ditch. The dirt from above the bank was allowed to wash or be plowed down against it, thus forming the level terrace gradually. One farmer, having abandoned the antebellum graded ditch system for this, called it the "Level, or Reconstructed System."¹⁵

The method of bench terracing developed by a Mr. Chisholm and W. P. Orme on a plantation at one time belonging to the former in Chambers County, in the Piedmont region of Alabama, near the Georgia line, exercised considerable influence on contemporaries. One rolling field on this place had been ineffectively hillside ditched at one time. The field had been cultivated and erosion had progressed until it was considered worn out and it was then abandoned. After a number of years Chisholm noticed that one of

¹⁴.Anon., "Terraced Gardens, etc.," Sou. Cult., 1st ser., v. 19 (July 1861), pp. 224-225.

¹⁵.Anon., "To Prevent Land Washing," By R. A. A., The Plantation, 1st ser., v. 2 (July 8, 1871), p. 373; T. J. McKie, "A Matter of Great Importance," Sou. Cult., 1st ser., v. 55 (July 15, 1897), p. 3; N. Hutchinson, "Grade Hill-Side Ditching vs. Level Hill-Side Ditching," Sou. Cult., 1st ser., v. 29 (Sept. 1871), p. 338.

Even as late as 1970 it was believed in some quarters that the meaning of true terrorism was too obvious to need further

[illegible][illegible]

12. "Forward Germany, etc.", 1940. (1940)

the old ditches had filled up and had become a dam for the soil washed from the land above, forming in effect a terrace. The accumulated washings supported a luxuriant growth of grasses and weeds. Benefiting by this example, Chisholm laid off contoured ridges across an adjoining field, so that these would become bench terraces also in a few years' time. He spaced the ridges 3 feet vertical distance apart and cultivated on the contour between the ridges. When Orme bought this place several years later he was so impressed with the success of this method of terracing that he soon applied it to the entire plantation. It was claimed that, after a thirteen years' trial, beginning about 1870, the original terraced field showed few signs of erosion, although it had often been planted to cotton. Orme was secretary and treasurer of the Atlanta and West Point Railway, and through his position may have been influential in spreading the news of this method. The Georgia State Department of Agriculture also published a paper on the subject.¹⁶

Some advocates of the system left narrow unplowed strips in the center of the horizontal ridges to prevent breakage the first year, and as a further precaution sowed grass seed on the ridges. As the banks grew steeper on the lower side with the passage of time, no attempt was made to cultivate them and they grew up naturally in grasses, weeds, and briars. The ridge or bank of

16. H. H. Cary, "Terracing," Sou. Cult., 1st ser., v. 41 (April 1883), p. 3; Anon., "The Value of Terracing," Fairfield News and Herald, Oct. 13, 1886, p. 1; William P. Harden, "Horizontal Terracing, Report of the Georgia Agricultural Department," Sou. Cult., 1st ser., v. 41 (July 1, 1883), p. 19.

[illegible]

1. The first of these is the "Agricultural Department" which is the largest and most important of the three. It is responsible for the production and distribution of food and other agricultural products. It is also responsible for the regulation of the agricultural industry and for the promotion of agricultural research and development.

the bench terrace thus resembled in some respects the hillside hedge. Indeed, the editor of the Southern Cultivator pointed out that the unplowed horizontal strips such as he had used and advocated for many years would build terraces effectively by stopping the soil on the upper side of the strips and "straining" the water that passed down the hill.¹⁷ In theory, the bank was supposed to attain a height of about three feet. The eventual height of the banks in practice, however, depended on the degree of slope, the methods of cultivation, the length of time the terraces were allowed to stand, and the vertical fall between terraces actually given. The steeper the slope and the older the terrace the higher the bank might become, and the bank might be built up by deliberately plowing down the soil from above. Bench terraces are to be found in South Carolina and elsewhere as much as 30 or 40 years old that are six feet or more in height on the lower side.

On the more gentle slopes or under methods of plowing that prevented the soil from moving down, the contoured ridge did not develop into a bench, but retained much the same profile as when first constructed. This type of terrace was termed the level ridge type. Like the bank of the bench terrace, it was generally too narrow to permit cultivation on top, and it was allowed to grow up in grass and weeds. In many instances the ends of the

¹⁷.Anon., "Terracing Land," Sou. Cult., 1st ser., v. 41 (April 1883), p. 16.

The first of these is the method of the "stepped" terrace, in which the slope is broken into a series of steps, each of which is a level terrace. This method is used where the slope is steep and the soil is light, and it is particularly suitable for the cultivation of such crops as wheat and corn. The second method is the "bench" terrace, in which the slope is broken into a series of benches, each of which is a level terrace. This method is used where the slope is steep and the soil is heavy, and it is particularly suitable for the cultivation of such crops as wheat and corn. The third method is the "contour" terrace, in which the slope is broken into a series of contours, each of which is a level terrace. This method is used where the slope is steep and the soil is light, and it is particularly suitable for the cultivation of such crops as wheat and corn.

In the case of the "stepped" terrace, the steps are usually made of stone or brick, and they are usually about 2 feet high. In the case of the "bench" terrace, the benches are usually made of stone or brick, and they are usually about 2 feet high. In the case of the "contour" terrace, the contours are usually made of stone or brick, and they are usually about 2 feet high.

terrace were closed so that the water either remained in the channel and soaked into the ground, or flowed over the face of the terrace. In other instances a slight fall was given near the end of the channel so that the water could drain off. The level ridge terrace was used widely on the more level land and more permeable soils.

The terrace seems to have contended for favor with the hillside ditch for about 15 or 20 years before firmly establishing its supremacy. Terracing is mentioned only infrequently in the survey of farming conditions in the cotton states published as part of the Tenth Census, 1880, whereas horizontal plowing and hillside ditching receive numerous references.¹⁸ By 1883, however, many articles on terracing were appearing in the agricultural press.

The former popularity of bench terraces is attested by the large number of bench terrace systems still to be found in the Southeast. There seems no doubt that plowing could be done with greater ease and fertilizer retained better on fields that were bench-terraced than on fields where the natural slope was maintained, if the slope was steep. It is probable, also, that moisture and soil were retained better. Bench terrace advocates, however, claimed some advantages which the device did not possess. In addition, the bench terrace did have definite disadvantages.

The theory of the horizontal bench terrace was that the water

18. Cotton Report, 1880, passim.

...was observed in the
...into the ground, or blown over the face of
...the surface. In other instances a slight hole was blown
...the end of the channel or into the side of the bank.
...level right terrace was used wholly on the same level land and
...new possible results.

The terrace seems to have commenced for level with the hill-
...the hill for about 15 or 20 feet before finally extending
...the terrace. According to mentioned only in the
...series of terraces conditions is not certain as to whether or
...part of the terrace bench, 1900, where horizontal plowing and
...difficult distinguishing terrace numerous references. In
...very, many examples of terracing were appearing in the adjacent
...level terrace.

The terrace bench... is situated in the
...large amount of soil... in the
...terrace. There seems to have been plowing...
...terrace and...
...bench-terrace than on hills where the natural slope was...
...terrace, in the shape of...
...and soil were retained better. Bench terrace advantages,
...terrace, which was...
...In addition, the bench terrace...
...The theory of the horizontal bench terrace was that the reason

would be held in place and soak into the ground to be used in subsequent dry periods, and would not run off and carry the sediment with it directly down the slope or out through a graded ditch. According to this theory, excess water would gently spill over the bank of the terraces in a thin sheet and pass down the hill harmlessly. In practice, the water did not behave as bench terrace enthusiasts hoped it would. The excess water that did not soak into the ground collected at low points along the terrace bank, and broke over, causing rills on the face of the terrace bank. If the terrace were neglected these rills became gullies. Water falling over the bank from one bench to the next often undermined the bank and caused the surface of the lower bench to wash. As the level bench developed, the relatively infertile subsoil of the hillside was exposed on the up-hill side of the bench, and was spread down-hill, covering the more fertile surface soil next to the terrace bank. It was claimed that the fertility of the entire surface was reduced in this way in many instances.¹⁹ Perhaps the most frequent objections voiced against bench terraces, however, were that they took too much land out of cultivation, obstructed cultivation, and harbored grass and weeds which easily spread from them to the remainder of the field. The necessity for some improved type of terrace became even more evident after the introduction of reapers, mowers, and tractors.

19. Anon., "Hill Side Ditching and Terracing," by E. F., Sou. Cult., 1st ser., v. 41 (May 1, 1883), p. 10; Anon., "About Farm Terracing," by E. F., Sou. Cult., 1st ser., v. 41 (July 1, 1883), p. 8.

...in fact it shows that the ...
...and would not run off and carry the soil-
...to this theory, excess water would gently spill
...in a thin sheet and pass down the
...In practice, the water did not behave as
...it would. The water was ...
...at the ground surface ...
...and ...
...It is ...
...the bank from one bench to the next often
...the level bench developed, the relatively ...
...in the ...
...It was claimed that the ...
...the ...
...most frequent objections voiced against bench ...
...were that they took too much land out of ...
...and harbored grass and weeds which
...some improved type of terrace became even ...
...the introduction of ...

...and ...
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...

Development of the Broad-Base Terrace

Pioneer workers had attempted to construct hillside ditches or similar structures that would not obstruct farming operations and harbor weeds. Richard N. Venable of Prince Edward County, Virginia designed structures that could be tilled with the remainder of the field, about the fourth decade of the nineteenth century. They were rounded beds 10 to 12 feet wide with water channels of equal width on the upper side.²⁰ Other farmers down through the years realized the advantages of broad banks and ditches. These earlier broad-base structures, however, had comparatively steep grades about like those of the contemporary hillside ditches. The essential features of the modern types of broad-base terraces, on the other hand, are a broad, low bank, shallow, wide ditch, and gentle grade.

Priestly H. Mangum of Wake County, North Carolina is usually credited with the invention of the broad-base, cultivable terrace, but certain other farmers, faced with the problem of using farm machinery among hillside ditches, seem to have been thinking along similar lines at about the same time. The intellectual climate of the North Carolina farming community in the early 1880's was favorable to the growth of broad-base terracing ideas. The plan of one farmer of Cabarrus County, North Carolina was to

20.A. W. Venable, "On Hill-Side Ditches," Farmers' Reg., v. 5 (1838), pp. 752-753.

Development of the Broad-Band Technique

The first step in the development of the broad-band technique was the realization that the conventional narrow-band technique was not adequate for the study of the broad-band spectrum. The broad-band spectrum is characterized by a continuous distribution of frequencies, and the narrow-band technique is not capable of resolving the individual components of this spectrum. The broad-band technique, on the other hand, is capable of resolving the individual components of the broad-band spectrum, and it is this capability that makes it a powerful tool for the study of the broad-band spectrum.

The broad-band technique is based on the principle of Fourier transform. The Fourier transform is a mathematical operation that converts a function of time into a function of frequency. The Fourier transform is a linear operation, and it is this linearity that makes it a powerful tool for the study of the broad-band spectrum. The Fourier transform is a linear operation, and it is this linearity that makes it a powerful tool for the study of the broad-band spectrum.

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plow a land about 35 feet wide, and with a scraper build up a flattened mound on the down-slope side of the land, leaving a waterway in the center. The idea of constructing the mound by moving the dirt from the upper side appears to have been the same as that of the modern Nichols terrace.²¹

P. H. Mangum, Sr., according to his son, bought a wheat binder at a time when they were comparatively rare in North Carolina. He found that when he used it in fields that had been hillside-ditched a large part of the crop was lost. He next attempted on one field to substitute wide grassed strips for ditches, but the slope was so great that these strips were ineffective. In 1885 he constructed his first terraces.²² Mangum's terraces were made about two feet high and six feet broad, with a flat depression about ten feet wide on the up-slope side. The grade was approximately eight to ten inches per 100 feet. Most of the terraces were discharged into wooded areas, but in one field a "canal", or wide ditch, was constructed to carry the discharge from the upper terraces to a stream bottom. Crop rows were often run across the terraces at an oblique angle. To prevent the terraces from being broken down by annual cultivation, it was found desirable, when plowing, to turn the furrows up the bank, making the back furrow along the ridge of the terrace. The plowing lands were shifted

21. Anon., "A 'Tar Heel' on Terraces and Ditches," by J. H. W., Jr., Sou. Cult., 1st ser., v. 41 (Sept. 1883), p. 6.

22. P. H. Mangum, "My Father Invented It," Country Gentleman, v. 100 (Nov. 1937).

... a foot wide, and with a scarp built up a
 ... on the down-slope side of the lane, leaving a
 ... in the center. The idea of connecting the mound by
 ... from the upper side appears to have been the

... of the western Nichols terrace. 21

... Dr., according to his son, bought a wheel blind-
 ... at a time when they were comparatively new in North Carolina.
 ... that there is a little thing about the hill-
 ... a large part of the top of the hill. The road followed an
 ... to substitute who passed early for others, but the
 ... that these things were ineffective. In 1871

... the ...
 ... feet high and six feet broad, with a flat top surface
 ... feet wide on the up-slope side. The grade was approxi-
 ... feet. Most of the terraces
 ... the ...
 ... to carry the drainage from the upper
 ... a stream bottom. Grap trees were often put across the
 ... at an oblique angle. The ground in the ...
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from time to time also to prevent too great a development of terrace or waterway.

Mangum's neighbors are said to have looked askance when he plowed down the traditional hillside ditches to make room for the new-fangled terraces, but before long they were coming to his farm to admire and learn. Among those who made the pilgrimage were representatives of the North Carolina State College and Experiment Station in nearby Raleigh.²³ A report published by the Station in 1888 advocating broad-base cultivable "hillside ditches" seems to indicate that independent thinking on the subject had been done there also.²⁴ A decade after Mangum's first trials the Station published a full set of instructions for the making of terraces by his method.²⁵

The younger Mangum came into possession of the farm after his father died, and was also an enthusiastic advocate of the broad-base terrace. He continued to practice diversification. Cotton, corn, and wheat were raised for sale, and rotations of wheat following peas, corn following clover, and cotton after rye were practiced. Some fields were planted to cotton for several years in succession, but since these fields were well terraced, Mangum

23.P. H. Mangum, Jr., "Big Success of the Mangum Terrace," American Agriculturist, v. 91 (Jan. 25, 1913), p. 105.

24.J. R. Chamberlain, "Hill-Side Ditches," Report no. 11, 1888, in N. C. Agri. Expt. Sta., Annual Report, 1889, pp. 115-117.

25.F. E. Emery, "Hill side Terraces or Ditches," Report no. 18, Jan. 31, 1896, in N. C. Agri. Expt. Sta., Annual Report, 1896, pp. 319-326.

There have been also to prevent too great a development of

the same in the future.

Langdon's criticism was said to have been advanced when he

showed that the traditional Illinois climate to have been a

the new-fangled theories, but before long they were coming to

the fact that the same was the case in the other

the new representatives of the North Carolina State College and

Experiment station in nearby Raleigh. A report published by

the station in 1908 advocating broad-based cultivation of Illinois

climate, seems to indicate that independent thinking on the part

that had been done there also. A decade after Langdon's time

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new, and wheat were raised for sale, and rotations of wheat and

other crops, and following these, the same was done in the

vicinity. Some time was given to raising the wheat and

in succession, but since then the same has been done in the

W. E. Langdon, Jr., "The Success of the Langdon Towers," *Annals*
of the Illinois Experiment Station, Vol. 1, No. 1, 1908.

W. E. Langdon, Jr., "The Success of the Langdon Towers," *Annals*
of the Illinois Experiment Station, Vol. 1, No. 1, 1908.

W. E. Langdon, Jr., "The Success of the Langdon Towers," *Annals*
of the Illinois Experiment Station, Vol. 1, No. 1, 1908.

felt that there was no danger of erosion. About 1913 Mangum purchased a steam tractor. It was impossible to make sharp turns with such a heavy machine and he tilled in straight lines across the terraces with it. In about two years' time some of the terraces had been allowed to deteriorate because of this method of plowing and tillage with the tractor, and Mangum intended to do away with most of them except on the steeper slopes, relying mainly upon frequent cover crops to prevent washing. The original Mangum terraces seem to have been obliterated at this time.²⁶ During the period of high cotton prices, after the boll weevil had struck the lower South but before it had reached North Carolina, the diversified system on the farms was abandoned to some extent in favor of the cotton, one-crop system. Either at this time or later the terraces were restored. There was an extensive system of terraces on the farm in 1941 when it was visited by the present writer. The Mangum terrace found most favor on farms practicing mixed culture, such as the Mangum farm in its earlier period, or on the more progressive of the cotton farms.

Other farmers and experiment station workers preferred the broad base level terrace to the Mangum graded terrace. Such a structure was similar to the Mangum terrace in most respects except that it had no grade. It was found to be suitable for sandy soils and gentle topography in the Coastal Plain, but it had its

26.C. E. Ramser, "Notes on Terrace Investigations," MS. A copy was loaned to the present writer through the courtesy of Mr. Ramser.

... that there was no danger of ...
... It was impossible to make sharp turns
... and he relied on straight lines
... In about two years' time some of the for-
... allowed to deteriorate because of this method of
... with the tractor, and ... intended to do
... except on the steeper slopes, relying
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advocates even in the Piedmont, and by 1915 its use was about as widespread as that of the graded terrace. After a survey of terracing practices in the Southeast, C. E. Ramser, drainage engineer of the United States Department of Agriculture, Office of Experiment Stations, concluded that the broad-base terrace without grade was in general the best type of terrace for preventing erosion and building land, that it caused the least waste of land, and was easiest to cultivate. Terraces having alternate lengths of graded and level waterway, which Ramser found in a few places, were also highly considered.²⁷

In the first two decades of the present century many of the bench terraces were plowed down in order to make room for farm machinery and broad-base terraces. This seems to have been especially true on the more progressive farms practicing mixed culture or in more gently rolling areas. A farmer of Anderson County, South Carolina, like Mangum, found that if a steam tractor was to be used, straight rows were necessary. He designed a terrace 18 to 24 feet broad to accommodate the use of the tractor.²⁸

There was rather wide regional variation in terrace types.

27. Anon., "Terracing Problems. How to Prevent the Destructive Washing of Land Considered," Prog. Farmer, v. 19 (Jan. 10, 1905), pp. 1-2; Ramser, "Notes on Terrace Investigations"; F. R. Baker, The Prevention and Control of Erosion in North Carolina, with Special Reference to Terracing, N. C. Agri. Expt. Sta. Bul. no. 236 (Raleigh, N. C., 1916), pp. 20-21; C. E. Ramser, Prevention of the Erosion of Farm Lands by Terracing, U.S.D.A., Bul. 512 (Washington, D. C., 1917), p. 30.

28. Ramser, "Notes on Terrace Investigations."

This was reflected to some extent in the recommendations of the different agricultural experimental stations. The early advocacy of the broad-base structures by the North Carolina Experiment Station has been noted. On the other hand, F. H. H. Calhoun of the South Carolina Station, as late as 1913, recommended the level bench terrace as most desirable for that state, although he recognized that the level ridge type was useful on slopes of less than ten percent and on sandy, porous soils, and that the Mangum terrace was adapted to impervious soils where surface drainage was necessary.²⁹

Localization of terrace types did not always conform to types of farming or differences in soils, however. It was observed that:

... where one type of terrace has proved successful, it creates a circle of influence and most other terraces in the neighborhood are similar to it; ... in one county or township, all of the terraces are likely to be falling terraces, while in another county, all may be level terraces.³⁰

Perhaps this tendency to uniformity of type could be traced in many cases to the influence of some individual who built terraces on a commercial basis. Many farmers entrusted the job of surveying the terrace lines and the initial building of the terraces to these men. These professionals sometimes had decided personal

29. F. H. H. Calhoun, Gullying and its Prevention, S. C. Agri. Expt. Sta. Circular 20 (Clemson College, S. C., October 1913).

30. F. R. Baker, op. cit., p. 12.

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preferences as to the type of terrace built, whether narrow or broad-base, level or graded.³¹

Terracing Equipment

The rafter levels or similar instruments built on the same principle were the favored instruments in laying off terraces in many localities even after the turn of the present century. The plumb line suspended from the center was replaced by a spirit level affixed to the cross piece in such a way that it could be raised or lowered to indicate a grade. The rafter level could be used to obtain the vertical distance between terraces as well as the horizontal line.³² Manufactured levelling instruments were for some time beyond the financial means of the rank and file of farmers, but one type eventually came into rather common use. It consisted of a pair of sights, similar to gun sights, with a spirit level between them. This assemblage was mounted so that it could revolve freely on a tripod or a staff driven into the ground. The surveyor's rod and target was used with this instrument. In some localities this type of level was called a "terracing machine." Terraces could be laid off more accurately with the level and rod than with the rafter level. Later this open-

31.G. F. Hunnicutt, "Terracing," Sou. Cult., 1st ser., v. 61 (Feb. 15, 1903), p. 31; Ramser, "Notes on Terrace Investigations."

32.Anon., "Terracing Land," Sou. Cult., 1st ser., v. 41 (April 1883), p. 16.

sight level was replaced by one having a telescope, enabling the operator to sight the rod at a much greater distance than with the older type of instrument.³³

Ordinary plows and various types of reversible moldboard hillside plows were used in throwing up the early terraces. Shortly after the Civil War one Georgia farmer used an instrument like a road scraper, or drag, to build up his banks.³⁴ Perhaps this was similar to a V-shaped wooden drag drawn by a team used in Cleveland County, North Carolina about 1915. This latter was used in the making of broad-base terraces and was recommended by the federal Department of Agriculture.³⁵ The development of more elaborate special machines for throwing up terraces was also being undertaken by a group of progressive farmers in Cleveland County at the same time. One of these was a subsoil plow with a wing on either side that could be moved up or down to throw the dirt up to the terrace bank.³⁶

So long as horse power alone was available the type of terrace builder that could be used was rather light and the terrace that could be made was rather small. A large number of time-

33.Cary, loc. cit.; Punifoy, W. S., "Terracing," Sou. Cult., 1st ser., v. 47 (April 1889); see also advertisement in Prog. Farmer, v. 32 (Jan. 20, 1917), p. 58.

34.Anon., "Grade Ditching," by Colonus, Sou. Cult., v. 29 (Dec. 1871), pp. 446-448.

35.Ramser, Prevention of Erosion by Terracing, pp. 35-37.

36.Ramser, "Notes on Terrace Investigations."

right hand was raised by one having a telescope, enabling
the operator to sight the rod at a much greater distance than
with the other type of instrument.

Without glass and without line or chain the instrument

was used in throwing up the early terraces.

Shortly after the Civil War one Georgia farmer used an instru-
ment like a small compass, or level, to build up his land.

This was similar to a V-shaped wooden frame drawn by a team
used in Maryland County, North Carolina about 1840. This in-

strument was the subject of a paper by the U. S. Geologi-
cal Survey, Department of Agriculture. The develop-

ment of most of the terraces in the South was due to the
use of being undertaken by a group of progressive farmers in

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that with a view to raising the level of the land was built

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So long as horse power alone was available the type of ter-

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consuming trips were required with a V-shaped drag or other horse-drawn machine to grade a broad-base terrace properly. The adaptation of tractors to this work and the development of special tractor-drawn terracers within the last fifteen years have decreased the time required to make terraces and increased the efficiency of the work. The making of the modern channel-type Nichols terrace is done almost entirely by gasoline-driven machinery.³⁷

On the other hand, the costs of such terracing machines are such that the individual farmer cannot usually afford them. He must have his terracing done on contract by the owner of a machine, join with his neighbors in the cooperative purchase and operation of a machine, have it done by a local conservation association, or rely upon governmental assistance, county, state, or federal, to aid him. Like the problem of soil conservation in general, the problem of terrace building has ceased to be the concern of the individual land owner alone and has become the concern of the community.

Role of Experiment Stations, Demonstration Agents, and United States Department of Agriculture

The state departments of agriculture interested themselves in the subject of terracing in a few cases. Material on the subject

³⁷C. L. Hamilton, Terracing for Soil and Water Conservation, U.S.D.A. Farmers' Bul. no. 1789 (Washington, D. C., 1938), pp. 40-42.

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Role of Government Stations, Demonstrations
Agents, and United States Department of Agriculture

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was published by the Georgia State Department of Agriculture. F. T. Meacham, working with the North Carolina State Board of Agriculture, published an article on terracing in 1904 and assisted farmers in building terraces.³⁸ The North Carolina Geological and Economic Survey also interested itself in terracing in connection with its work on the broader phases of soil, water, and forest conservation.³⁹ In general, however, it was left to the state experiment stations, agricultural colleges, and the federal Department of Agriculture to do most of the work in this field. The many publications of the experiment stations and colleges are noted elsewhere in this Chapter. At first the experiment stations published bulletins and papers based on observation and the experience of progressive farmers or members of the station staffs.

The United States Department of Agriculture started to explore the possibilities of terracing at a comparatively late period. One of its first attempts to advise farmers on terrace construction advocated something akin to the level ridge terrace and received criticism from a champion of the bench terrace.⁴⁰ In 1900

38. F. T. Meacham, "Terracing and Other Means of Preventing Lands from Washing," N. C. State Board of Agri., Bul., v. 25 (Oct. 1904), pp. 26-31; R. B. Sullivan, "The Terrace as a Soil Saver," Prog. Farmer, v. 23 (Oct. 3, 1907), p. 16.

39. W. W. Ashe, Terracing of Farm Lands, N. C. Geol. and Econ. Survey, Bul. no. 17 (Raleigh, N. C., 1908).

40. J. S. Newman, "What is a Terrace?" Sou. Cult., 1st ser., v. 55 (April 1, 1897), p. 3.

and published in the *Journal of Agricultural Research*.
 A. C. Henshaw, *Journal of Agricultural Research*, 1914, p. 10.
 published an article on termites in 1914 and an
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 one of the first attempts to secure interest in termites was
 that reported something akin to the level ridge termites and ter-
 mite colonies from a specimen of the porch termites.¹⁰ In 1914

10. V. H. Henshaw, "Termites and Other Means of Farming in the
 South," *U. S. State Board of Agriculture*, v. 12 (1914), p. 10.
 11. H. H. Henshaw, "The Termites and Their Control,"
Journal of Agricultural Research, 1914, p. 10.
 12. H. H. Henshaw, "The Termites and Their Control,"
Journal of Agricultural Research, 1914, p. 10.
 13. H. H. Henshaw, "The Termites and Their Control,"
Journal of Agricultural Research, 1914, p. 10.

James Wilson, Secretary of Agriculture, in an address to the southern state commissioners of agriculture said that the "recourse" to terracing was "doubtless wise," but that the seeding down of hillsides to grasses and legumes would be much more effectual.⁴¹ Nevertheless, preliminary studies of terracing were undertaken by the Office of Experiment Stations of the Department of Agriculture in 1903-1904.

The next step in the Department's program of terrace investigation seems to have been a field trip made by C. E. Ramser through the southeastern states in 1915 to study terracing methods. He visited farmers, experiment station workers, and state and county demonstration agents.⁴² Much of Ramser's time was spent in the Piedmont region but he also travelled as far west as Mississippi. The trip resulted in the first comprehensive publication by the Department of Agriculture on this subject: Bulletin No. 512, Prevention of the Erosion of Farm Lands by Terracing (1917). In this bulletin Ramser described the different types of terraces and evaluated the types with respect to various factors: amount of erosion, amount of land occupied by terraces, ease of cultivation, soil structure and texture, and slope. He also gave directions for building and maintaining terraces, based on the best current practice. This was the first of a series of

⁴¹James Wilson, "Southern Agricultural Problems," Prog. Farmer, v. 15 (Sept. 18, 1900), p. 1.

⁴²Ramser, "Notes on Terrace Investigations."

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publications embodying knowledge of improved techniques in methods of terrace maintenance and construction. In later years this information was not dependent on farmer practices alone but also on results of investigations at the experiment stations.

Among the investigations initiated at the state experiment stations, those of M. L. Nichols of Alabama Polytechnic Institute, Auburn, Alabama were important because they resulted in the designing of a terrace type later used widely in the Southeast and adopted by the Soil Conservation Service. The Nichols terrace differed from the Mangum or other earlier broad-base types in that the bank was constructed from the upper side rather than from the lower side or both sides equally. The bank was to be cultivated in such a way that it would become very wide and low and in effect blend into the lower slope. The emphasis was upon the development of a broad waterway, instead of an embankment, and for this reason the Nichols terrace is designated as a "channel type". The principal advantage of this terrace is that it offers less obstruction to farm machinery than the older broad-base types.⁴³

After the inauguration of the system of county farm demonstration agents and the Extension Service of the Department of Agriculture, increasing attention was devoted to educational work in terracing. After 1914 the state agricultural extension engineers and county agents built terraces for farmers and

⁴³.Hamilton, op. cit., passim.

instructed them in terrace making and maintenance. The result was a considerable increase in the acreage of terraced land. In 1915 the Extension Service reported about 125,000 acres of land benefited by terraces and soil-saving dams in the southeastern region, including Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, and Virginia. In 1929 in the same region something like 700,000 acres were so protected.⁴⁴

Among the pioneer county agents to spread the knowledge of terracing in the Piedmont region were J. F. Hart of Greene County, Georgia and Dr. Gidney of Cleveland County, North Carolina. Hart laid out about 61 miles of broad base level terraces in 1914. Gidney had apparently been a terrace enthusiast before he became farm demonstration agent and had succeeded in reclaiming his own 320-acre farm from gullies by a system of level terraces. By 1915 he had run level broad-base terraces on about 6,000 acres in Cleveland County.⁴⁵ At that time Cleveland was one of the best-terraced counties in the state, and was called "the county of terraces". Gidney was to a great degree responsible for the enlightened methods used here, and seems to have inspired a group of farmers who were equally progressive in developing terracing methods and terracing equipment.

The work of the county agents, although valuable in many instances, was at first uncoordinated, and was based on their

⁴⁴.Ibid., pp. 4-5.

⁴⁵.Ramser, "Notes on Terrace Investigations."

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Source: The Library of Congress, Manuscript Division, RG 226, Entry 105, Box 105, Folder 105.

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"The concept of 'forfeiture'." Didn't want to a great deal of money.

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individual preferences or experiences, unsupported by a program of research to determine the best types of terraces for different conditions. In this respect the county agents merely supplemented the work of the semi-professional terrace makers.

In the 1920's and early 1930's the extension work was further increased by the inauguration of terracing schools. These were held for a few days in the winter or spring under the auspices of some of the state colleges. Farmers learned the techniques of terrace making and the more proficient were given certificates. Many certificate holders did terracing on a commercial basis for their neighbors.⁴⁶

Relation of Terracing to the Farming System

The southern land owner of the post-bellum period who attempted to preserve his land by terracing or any other means under the prevailing system of tenancy and share cropping was faced with a particularly knotty problem. At first he was forced to operate with only limited capital, and with laborers unaccustomed to the benefits of freedom, who did not have financial interest in the land. Later, after the pattern of share cropping, tenancy, and the lien system had been set, the landlord's control over the use of his own land often became rather tenuous.

⁴⁶F. H. Jeter, "Notes from North Carolina," Sou. Planter, 3rd ser., v. 88 (April 15, 1927), pp. 2, 7.

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Relation of Torpedo to the Learning System

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The cropping-lien systems set a premium upon cash crop production on small capital investment and discouraged experimentation with techniques that required long-range planning. The efforts to teach the methods of terrace construction and maintenance to poverty-stricken and ignorant small farmers and tenants therefore met with considerable obstacles.

Immediately following the Civil War there was a belief in some quarters that free negro labor could not be depended upon to maintain hillside ditches and that some simpler methods of erosion control, perhaps hillside strips, would come into use.⁴⁷ As we have seen, hillside stripping did enjoy a limited popularity in this period, but in the long run the mechanical techniques of erosion control became even more elaborate rather than less so. This made it incumbent upon the farm owner to exercise as close supervision as possible over his croppers or other laborers. Land owners were far too prone, as one of them expressed it, to take an interest in their property only on "pay-day". He declared that tenants, as part of the contract, should agree to work by the landlord's "rule" and that the landlord, as part of his "rule" should personally see to it that tenants repaired terraces after every rain and in other respects took care of them properly.⁴⁸ Evidently the men who terraced successfully adopted

⁴⁷. Francis Fontaine, "Study Nature--Hill-Side Ditching and Cheap Fertilization," The Plantation, n. s., v. 3 (May 1873), pp. 296-298.

⁴⁸. John M. Ingram, Jr., "Hill Side Ditching vs. Terracing," Sou. Cult., 1st ser., v. 42 (Sept. 1884), p. 298.

some such plan as this, but many terraces were improperly made and poorly maintained by landlords and tenants alike.

The earlier complaints regarding inadequate construction of hillside ditches were re-echoed in respect to terraces. The editor of the Southern Cultivator complained in 1898 that farmers were not "skilled in the work" or did not appreciate the necessity for laying off terraces properly.⁴⁹ Ramser concluded from his survey in 1915 that although terracing was widespread in the Piedmont, in only a few sections were efficient results obtained and that the many failures were due to unsuitable design, faulty construction, or improper maintenance. A study of terraces built by farmers before 1933 covering 14,257 acres in the lower South revealed that in a majority of cases there had been improper construction, and that on 83 percent of the fields the terraces were not maintained correctly.⁵⁰

The failure of terraces to do the job cut out for them was used by one school of thought in the early years of the present century as an argument for the abandonment of the practice entirely. Most prominent of this school, perhaps, was W. F. Massey, at different times professor in North Carolina State College, Virginia Piedmont farmer, and writer for the rural press. His

49.[Editor], "Defective Terraces," Sou. Cult., 1st ser., v. 46 (June 1, 1898), p. 17.

50.Ramser, Prevention of Erosion by Terracing, p. 38; Arvy Carnes and W. A. Weld, "A Study of Old Farmer-Built Terraces," Agricultural Engineering, v. 22 (Oct. 1941), pp. 361-362, 366.

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THE UNITED STATES DEPARTMENT OF AGRICULTURE

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— "We are all citizens of the world" —

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Improving will be asked please may all requests be made and all done.

Security is an important factor in the development of the business.

11. The following is a list of the names of the persons who have been appointed to the various committees of the Board of Directors of the American Telephone and Telegraph Company, for the year ending December 31, 1914:

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English Version First, and Polish for the next time.

1. The first part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them. The list includes names such as "John Doe", "Jane Smith", and "Robert Johnson", among others. The addresses are also listed, often including street names and city names.

1941, pp. 181-182, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

practical experience as a farmer seems to have been in areas north of the cotton belt, but he insisted that his advice was applicable on cotton farms. Massey said that deep plowing and subsoiling should be practiced, making a bed of loose soil 15 inches deep, and that the crops should be cultivated level and shallow, without furrows between the rows where water could gather and form a gully-cutting head. Humus must also be incorporated in the soil. For this purpose rotations including cowpeas, rye, and crimson clover for manure and cover crops should be interspersed with the cash crops. Massey admitted that terraces could not be dispensed with immediately on cotton farms, since the fields had been wastefully tilled for so long that several seasons would be required to restore humus to the soil and renew its moisture-absorption capacity. When these objects had been accomplished, however, the "hideous weed-grown lines" of terraces could be plowed down.⁵¹ The terrace was for the present a necessary evil, thought Massey, and the Mangum terrace was the best specimen of a poor breed. He declared that:

... so long as the hills of the cotton country are kept plowed ... year after year, and the plowing is done with a mule to a tooth pick, there must be some means to carry the water slowly down the hill ... Mr. Mangum's terraces are the best thing of the sort...⁵²

51. W. F. Massey, "Rotation for a Cotton Farm--No. 3," Prog. Farmer, v. 22 (July 25, 1907), p. 9; Massey, "Why the Red Hills Wash," Country Gent., v. 72 (Sept. 19, 1907), p. 878.

52. Massey, "Terraces," Sou. Planter, 3rd ser., v. 74 (March 1913), pp. 260-261.

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1. General (1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591

Massey claimed that a number of northern farmers who had settled in Georgia, as well as other farmers in North Carolina and Alabama, had followed his advice with marked success. Few progressive farmers and none of the experiment station workers would have questioned the desirability of deeper plowing and the cultivation of manuring and cover crops. In fact, about the earliest bulletin of the South Carolina station on bench terraces advocated that they be used in conjunction with pea crops and crimson clover as erosion preventives.⁵³ On the other hand, considerable objection was raised to Massey's idea that terraces should be done away with entirely. Some working farmers answered that in a climate where torrential downpours were frequent in summer, deep plowing alone was insufficient to prevent erosion, and that terraces were essential supplements.⁵⁴ In October, 1915 the Progressive Farmer summed up the views of this school of thought in the following words:

It is idle to say that deep plowing will keep hill lands from washing; it is futile to say that all these lands should be kept in grass. Deep plowing and humus will not alone keep such lands from washing, and the time will never be when large areas of such lands all over the South will not be in clean cultivated crops.⁵⁵

53. J. S. Newman, Protection and Improvement of Worn Soils, S. C. Agri. Expt. Sta. Bul. no. 32 (Greenville, S. C., 1897).

54. R. B. Sullivan, "The Terrace as a Soil Saver," Prog. Farmer, v. 22 (Oct. 3, 1907), p. 16; O. W. Blackmall, "Deep-Plowing Not a Substitute for Terracing," Prog. Farmer, v. 22 (Oct. 3, 1907), p. 16.

55. [Editor], "The Cultivated Hill Lands Must be Terraced," Prog. Farmer, v. 30 (Oct. 23, 1915), p. 976 (2).

Massey and the comparatively small number who believed with him that terracing was only a transitional device to a more perfect method of erosion control had set themselves against the prevailing trend. The terracing advocates were becoming more popular rather than less so. The farmer might plow down his old bench terraces or hillside ditches to replace them with broad-base structures, but he was not likely to abandon terracing entirely. The program advocated by Massey took no account of the broader aspects of the cotton farming economy. The tenancy and crop lien systems and the poverty of even many of the small farm owners discouraged long-range experiments with legumes and grasses or purchase of heavy plows and other equipment. The market for cotton was established, whereas any widespread change-over to forage crops and animal products, such as was implied in Massey's system would have required the development of new markets.

There was, perhaps, considerable truth in the assertion that deep plowing and filling the land with humus were not sufficient to prevent soil destruction in the southern climate, especially in those years of the proposed rotation when cotton or corn was the crop. Otherwise Massey's program, in theory, was quite correct. It was a program for the future: for a time when urbanization in the Piedmont should furnish a local market for widely developed diversified agriculture. However, Massey's tendency to ignore the market conditions of his time and the cropper-lien system with which the farmer was faced gave his suggestions an air of unreality.

Terracing was a device that fitted into the prevailing economic

system. Under this system the farmer was obliged to devote a large portion of his land to clean tilled crops, but the climate and the topography also forced him to practice some means of erosion control. Terraces furnished a degree of protection under these conditions. The fact that Piedmont farmers developed first the bench terrace and then the more advanced types of broad-base terraces adaptable to heavy field equipment proved that, within the limits of the prevailing system of farming, they could be progressive. The extent of the failure to maintain terraces adequately was a measure of the inability of the system as a whole to preserve the land, more than it was a proof of the undesirability of terracing. Whether it will become possible to dispense with terraces entirely as Piedmont agriculture becomes more diversified is a question which even yet is unanswered.

APPENDICES

The following are the **APPENDICES** of the Report of the Committee on the Administration of the Government of the District of Columbia, submitted to the House of Representatives, June 1, 1902.

1. A list of the names of the members of the Committee, and of the names of the members of the House of Representatives, who have served on the Committee since its organization in 1898.

2. A list of the names of the members of the Committee, and of the names of the members of the House of Representatives, who have served on the Committee since its organization in 1898.

3. A list of the names of the members of the Committee, and of the names of the members of the House of Representatives, who have served on the Committee since its organization in 1898.

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14. A list of the names of the members of the Committee, and of the names of the members of the House of Representatives, who have served on the Committee since its organization in 1898.

15. A list of the names of the members of the Committee, and of the names of the members of the House of Representatives, who have served on the Committee since its organization in 1898.

Appendix I

COMPOSITION OF THE ORIGINAL FOREST

In order to obtain a sample of the composition of the forest at the time of settlement original survey plats were examined for an area in the northwest part of the present Fairfield County, S. C.¹ The area is bounded roughly by U. S. highway No. 215 on the east, Rock Creek on the south, Broad River on the west, and an east-west line through Feasterville on the north, but it was not possible to find plats covering the entire area. There were 43 plats covering 8,768 acres, surveyed between the years 1755 and 1789. According to Robert Mills, no surveys were made in this part of South Carolina until a decade after the land was taken up by the settlers.² Nevertheless the sample represents the virgin

1. Flat Books, Office of Secretary of State of South Carolina, Columbia, S. C. Acknowledgments are due to the staff of the Office of Secretary of State for use of the plat books, and to the U.S.D.A. Forest Service, Columbia and Newberry, S. C., for assistance in fitting the plats together on the map.

2. Mills, Statistics of South Carolina, p. 556.

conditions at the time of settlement, for in all probability the surveyors marked only the older and larger trees. The kind and number of trees marked along the boundaries of the plats by the surveyors were as follows:

| | |
|---------------------------|-------------------------------|
| red oak - 66 | black gum - 6 |
| white oak - 55 | gum - 5 |
| post oak - 44 | ash - 4 |
| black oak - 15 | dogwood - 3 |
| other oaks (5 kinds) - 35 | sassafras - 2 |
| pine - 105 | cedar - 2 |
| hickory - 95 | scaley bark hickory - 2 |
| poplar - 7 | maple, walnut, mulberry,) |
| | elm, birch, sycamore,) 1 |
| | sweet gum, sugar tree,) each |
| | persimmon, willow) |

The streams were the principal landmarks used in locating these plats on the map of the area; as a result the blank places on the map are mainly on the interfluvial ridges. It is possible that if all the surveys could be examined there would be an even higher percentage of pine.

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There were the principal landmarks used in localizing

There are no other factors which influence the amount of water in the soil.

Appendix II

GENERAL TABLES

Except where otherwise indicated, all population and agricultural statistics are from the printed reports of the Federal decennial censuses. The first census of population was taken in 1790 and the first complete census of agriculture in 1840. In addition to the decennial censuses of agriculture, enumerations covering that subject were taken in 1925, 1935, and 1945. Selected data for these latter dates are used in Chapters IV and VI. In using the agricultural data before the 1930 census, it was assumed that inventory items referred to the year of the enumeration, but that production items referred to the preceding year; e.g., that in the Eighth Census, the data on improved land and livestock on hand are for 1860, but the data for bushels of corn, bales of cotton, etc. produced are for the preceding crop year, 1859. In the case of the earlier census periods there is room for doubt as to the validity of this assumption, especially as regards winter grains. There is nevertheless ample precedent for the use of this

method in such works as Robert, Tobacco Kingdom and Stine and Baker, Atlas of American Agriculture, Cotton.

The agricultural census reports for 1925 and for each succeeding census date give both land use items and crop items for the preceding year rather than the census year. This accounts for the fact that in this study the tables of improved land show statistics for the even decennial year from 1840 to 1920, but for the odd years 1929 and 1939 as the last two dates. From 1850 to 1920 land was classified simply as "improved" and "unimproved" in most census reports. In order to derive a figure for "improved land" for 1929 approximately comparable to the older data, the classifications "crop land harvested," "crop land failure," "crop land idle or fallow," "Plowable pasture," and "other pasture" (except "woodland pasture") have been added together. For 1939 the same classifications have been combined into one total, with the exception of "other pasture," which was not listed separately in the census for that year. It is believed that the combined figure for 1929 is more nearly comparable to the older "improved land" category than that for 1939. The actual decrease, if any, in "improved land" between 1929 and 1939 cannot be measured accurately, and the comparison of "improved land" in 1939 with that in 1920 or any preceding census year seems less valid than between 1929 and the earlier dates.

Figures on the amount of cotton produced are given in bales from 1850 to 1945. Because the size of the bale has varied from time to time, the figures were reduced to pounds, using the number of pounds per bale specified in each census down to 1880. For

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...of the ...

The ...

... give both land use ...

... year ...

... the ...

... year from 1940 to 1945, but for the

... 1945 and 1950 as the last two dates. From 1950 to 1955

... in ...

... In order to derive a figure for "improved land"

... the ...

... "crop land harvested," "crop land fallow," "crop land

... "other pasture," "other pasture," "other pasture,"

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the censuses of 1890 and later it was assumed that the average size of the bale was 500 pounds.

Table No. 1

Tobacco and Mixed Farming Area:
Acreage and Production of Principal Crops
(000 omitted)

| | 1839 | 1849 | 1859 | 1869 | 1879 | 1889 | 1899 | 1909 | 1919 | 1929 | 1939 |
|---------|------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| Corn | a. | | | | | | | | | | |
| | bu. | 13,008 | 14,590 | 13,878 | - | 1,004 | 925 | 1,089 | 1,022 | 869 | 867 |
| | | | | | 7,707 | 13,573 | 10,668 | 16,951 | 15,915 | 15,215 | 17,177 |
| Cotton | a. | | | | | | | | | | |
| | lb. | 7,849 | 4,121 | 6,831 | - | 176 | 192 | 158 | 171 | 234 | 79 |
| | | | | | 7,006 | 37,180 | 24,533 | 31,590 | 41,181 | 53,710 | 19,863 |
| Oats | a. | | | | | | | | | | |
| | bu. | 4,795 | 4,212 | 3,914 | - | 459 | 362 | 202 | 121 | 18 | 45 |
| | | | | | 3,343 | 3,470 | 2,921 | 1,763 | 1,427 | 340 | 1,063 |
| Tobacco | a. | | | | | | | | | | |
| | lb. | 65,111 | 55,460 | 98,866 | 34,926 | 77,161 | 66,244 | 154,034 | 174,772 | 257,852 | 335,400 |
| | | | | | - | 148 | 169 | 256 | 274 | 401 | 399 |
| | | | | | | | | | 180,901 | 257,852 | 335,400 |
| Wheat | a. | | | | | | | | | | |
| | bu. | 2,111 | 2,735 | 4,681 | 2,556 | 450 | 462 | 498 | 405 | 309 | 252 |
| | | | | | - | 2,638 | 3,178 | 3,199 | 3,477 | 3,325 | 3,031 |
| Hay | a. | | | | | | | | | | |
| | tons | - | - | - | - | 62 | 119 | | 207 | 226 | 426 |
| | | 43 | | 89 | | 58 | 124 | | 219 | 251 | 452 |

2

THE UNIVERSITY OF CHICAGO PRESS

| DATE | TIME | TYPE | FROM | TO | FARE | TAX | TOTAL | REMARKS |
|------|-------|---------|--------------|--------------|--------|-------|--------|---------|
| 1971 | 12:00 | REGULAR | NEW YORK | PHILADELPHIA | 100.00 | 00.00 | 100.00 | |
| 1971 | 12:00 | REGULAR | PHILADELPHIA | NEW YORK | 100.00 | 00.00 | 100.00 | |
| 1971 | 12:00 | REGULAR | NEW YORK | PHILADELPHIA | 100.00 | 00.00 | 100.00 | |
| 1971 | 12:00 | REGULAR | PHILADELPHIA | NEW YORK | 100.00 | 00.00 | 100.00 | |
| 1971 | 12:00 | REGULAR | NEW YORK | PHILADELPHIA | 100.00 | 00.00 | 100.00 | |
| 1971 | 12:00 | REGULAR | PHILADELPHIA | NEW YORK | 100.00 | 00.00 | 100.00 | |
| 1971 | 12:00 | REGULAR | NEW YORK | PHILADELPHIA | 100.00 | 00.00 | 100.00 | |
| 1971 | 12:00 | REGULAR | PHILADELPHIA | NEW YORK | 100.00 | 00.00 | 100.00 | |
| 1971 | 12:00 | REGULAR | NEW YORK | PHILADELPHIA | 100.00 | 00.00 | 100.00 | |
| 1971 | 12:00 | REGULAR | PHILADELPHIA | NEW YORK | 100.00 | 00.00 | 100.00 | |

Table No. 2

Cotton Plantation Area:
Acreage and Production of Principal Crops
(000 omitted)

| | <u>1839</u> | <u>1849</u> | <u>1859</u> | <u>1869</u> | <u>1879</u> | <u>1889</u> | <u>1899</u> | <u>1909</u> | <u>1919</u> | <u>1929</u> | <u>1939</u> |
|------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Corn a.
bu. | 13,587 | 16,075 | 11,917 | 5,557 | 882 | 829 | 1,004 | 883 | 976 | 678 | 790 |
| Cotton a.
lb. | 121,809 | 143,155 | 146,058 | 99,490 | 1,294 | 1,659 | 1,675 | 1,976 | 1,793 | 915 | 536 |
| | | | | | 201,919 | 301,897 | 266,314 | 377,788 | 375,963 | 184,350 | 163,094 |
| Oats a.
bu. | 1,518 | 2,838 | 947 | 659 | 243 | 225 | 155 | 173 | 81 | 44 | 120 |
| | | | | | 2,518 | 2,135 | 1,582 | 2,544 | 1,268 | 972 | 2,475 |
| Wheat a.
bu. | 1,374 | 953 | 1,265 | - | 187 | 75 | 130 | 24 | 45 | 30 | 106 |
| | | | | | 1,291 | 430 | 783 | 201 | 359 | 267 | 1,049 |
| Hay a.
tons | - | - | - | - | 6 | 21 | 95 | 95 | 53 | 53 | 143 |
| | 12 | 32 | 6 | 6 | 23 | 23 | 99 | 99 | 45 | 45 | 111 |

THE INDEX

THE INDEX is a list of the names of the persons and places mentioned in the text, arranged in alphabetical order. It is a valuable aid to the reader, and is especially useful in the case of names which are not well known.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-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| 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 | 380 | 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 | 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 518 | 519 | 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 | 541 | 542 | 543 | 544 | 545 | 546 | 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 | 560 | 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 | 578 | 579 | 580 | 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 | 601 | 602 | 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 | 620 | 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 | 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 658 | 659 | 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 | 678 | 679 | 680 | 681 | 682 | 683 | 684 | 685 | 686 | 687 | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 | 700 | 701 | 702 | 703 | 704 | 705 | 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 | 718 | 719 | 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 | 729 | 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 | 738 | 739 | 740 | 741 | 742 | 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 770 | 771 | 772 | 773 | 774 | 775 | 776 | 777 | 778 | 779 | 780 | 781 | 782 | 783 | 784 | 785 | 786 | 787 | 788 | 789 | 790 | 791 | 792 | 793 | 794 | 795 | 796 | 797 | 798 | 799 | 800 | 801 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 810 | 811 | 812 | 813 | 814 | 815 | 816 | 817 | 818 | 819 | 820 | 821 | 822 | 823 | 824 | 825 | 826 | 827 | 828 | 829 | 830 | 831 | 832 | 833 | 834 | 835 | 836 | 837 | 838 | 839 | 840 | 841 | 842 | 843 | 844 | 845 | 846 | 847 | 848 | 849 | 850 | 851 | 852 | 853 | 854 | 855 | 856 | 857 | 858 | 859 | 860 | 861 | 862 | 863 | 864 | 865 | 866 | 867 | 868 | 869 | 870 | 871 | 872 | 873 | 874 | 875 | 876 | 877 | 878 | 879 | 880 | 881 | 882 | 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 | 893 | 894 | 895 | 896 | 897 | 898 | 899 | 900 | 901 | 902 | 903 | 904 | 905 | 906 | 907 | 908 | 909 | 910 | 911 | 912 | 913 | 914 | 915 | 916 | 917 | 918 | 919 | 920 | 921 | 922 | 923 | 924 | 925 | 926 | 927 | 928 | 929 | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 | 938 | 939 | 940 | 941 | 942 | 943 | 944 | 945 | 946 | 947 | 948 | 949 | 950 | 951 | 952 | 953 | 954 | 955 | 956 | 957 | 958 | 959 | 960 | 961 | 962 | 963 | 964 | 965 | 966 | 967 | 968 | 969 | 970 | 971 | 972 | 973 | 974 | 975 | 976 | 977 | 978 | 979 | 980 | 981 | 982 | 983 | 984 | 985 | 986 | 987 | 988 | 989 | 990 | 991 | 992 | 993 | 994 | 995 | 996 | 997 | 998 | 999 | 1000 | 1001 | 1002 | 1003 | 1004 | 1005 | 1006 | 1007 | 1008 | 1009 | 1010 | 1011 | 1012 | 1013 | 1014 | 1015 | 1016 | 1017 | 1018 | 1019 | 1020 | 1021 | 1022 | 1023 | 1024 | 1025 | 1026 | 1027 | 1028 | 1029 | 1030 | 1031 | 1032 | 1033 | 1034 | 1035 | 1036 | 1037 | 1038 | 1039 | 1040 | 1041 | 1042 | 1043 | 1044 | 1045 | 1046 | 1047 | 1048 | 1049 | 1050 | 1051 | 1052 | 1053 | 1054 | 1055 | 1056 | 1057 | 1058 | 1059 | 1060 | 1061 | 1062 | 1063 | 1064 | 1065 | 1066 | 1067 | 1068 | 1069 | 1070 | 1071 | 1072 | 1073 | 1074 | 1075 | 1076 | 1077 | 1078 | 1079 | 1080 | 1081 | 1082 | 1083 | 1084 | 1085 | 1086 | 1087 | 1088 | 1089 | 1090 | 1091 | 1092 | 1093 | 1094 | 1095 | 1096 | 1097 | 1098 | 1099 | 1100 | 1101 | 1102 | 1103 | 1104 | 1105 | 1106 | 1107 | 1108 | 1109 | 1110 | 1111 | 1112 | 1113 | 1114 | 1115 | 1116 | 1117 | 1118 | 1119 | 1120 | 1121 | 1122 | 1123 | 1124 | 1125 | 1126 | 1127 | 1128 | 1129 | 1130 | 1131 | 1132 | 1133 | 1134 | 1135 | 1136 | 1137 | 1138 | 1139 | 1140 | 1141 | 1142 | 1143 | 1144 | 1145 | 1146 | 1147 | 1148 | 1149 | 1150 | 1151 | 1152 | 1153 | 1154 | 1155 | 1156 | 1157 | 1158 | 1159 | 1160 | 1161 | 1162 | 1163 | 1164 | 1165 | 1166 | 1167 | 1168 | 1169 | 1170 | 1171 | 1172 | 1173 | 1174 | 1175 | 1176 | 1177 | 1178 | 1179 | 1180 | 1181 | 1182 | 1183 | 1184 | 1185 | 1186 | 1187 | 1188 | 1189 | 1190 | 1191 | 1192 | 1193 | 1194 | 1195 | 1196 | 1197 | 1198 | 1199 | 1200 | 1201 | 1202 | 1203 | 1204 | 1205 | 1206 | 1207 | 1208 | 1209 | 1210 | 1211 | 1212 | 1213 | 1214 | 1215 | 1216 | 1217 | 1218 | 1219 | 1220 | 1221 | 1222 | 1223 | 1224 | 1225 | 1226 | 1227 | 1228 | 1229 | 1230 | 1231 | 1232 | 1233 | 1234 | 1235 | 1236 | 1237 | 1238 | 1239 | 1240 | 1241 | 1242 | 1243 | 1244 | 1245 | 1246 | 1247 | 1248 | 1249 | 1250 | 1251 | 1252 | 1253 | 1254 | 1255 | 1256 | 1257 | 1258 | 1259 | 1260 | 1261 | 1262 | 1263 | 1264 | 1265 | 1266 | 1267 | 1268 | 1269 | 1270 | 1271 | 1272 | 1273 | 1274 | 1275 | 1276 | 1277 | 1278 | 1279 | 1280 | 1281 | 1282 | 1283 | 1284 | 1285 | 1286 | 1287 | 1288 | 1289 | 1290 | 1291 | 1292 | 1293 | 1294 | 1295 | 1296 | 1297 | 1298 | 1299 | 1300 | 1301 | 1302 | 1303 | 1304 | 1305 | 1306 | 1307 | 1308 | 1309 | 1310 | 1311 | 1312 | 1313 | 1314 | 1315 | 1316 | 1317 | 1318 | 1319 | 1320 | 1321 | 1322 | 1323 | 1324 | 1325 | 1326 | 1327 | 1328 | 1329 | 1330 | 1331 | 1332 | 1333 | 1334 | 1335 | 1336 | 1337 | 1338 | 1339 | 1340 | 1341 | 1342 | 1343 | 1344 | 1345 | 1346 | 1347 | 1348 | 1349 | 1350 | 1351 | 1352 | 1353 | 1354 | 1355 | 1356 | 1357 | 1358 | 1359 | 1360 | 1361 | 1362 | 1363 | 1364 | 1365 | 1366 | 1367 | 1368 | 1369 | 1370 | 1371 | 1372 | 1373 | 1374 | 1375 | 1376 | 1377 | 1378 | 1379 | 1380 | 1381 | 1382 | 1383 | 1384 | 1385 | 1386 | 1387 | 1388 | 1389 | 1390 | 1391 | 1392 | 1393 | 1394 | 1395 | 1396 | 1397 | 1398 | 1399 | 1400 | 1401 | 1402 | 1403 | 1404 | 1405 | 1406 | 1407 | 1408 | 1409 | 1410 | 1411 | 1412 | 1413 | 1414 | 1415 | 1416 | 1417 | 1418 | 1419 | 1420 | 1421 | 1422 | 1423 | 1424 | 1425 | 1426 | 1427 | 1428 | 1429 | 1430 | 1431 | 1432 | 1433 | 1434 | 1435 | 1436 | 1437 | 1438 | 1439 | 1440 | 1441 | 1442 | 1443 | 1444 | 1445 | 1446 | 1447 | 1448 | 1449 | 1450 | 1451 | 1452 | 1453 | 1454 | 1455 | 1456 | 1457 | 1458 | 1459 | 1460 | 1461 | 1462 | 1463 | 1464 | 1465 | 1466 | 1467 | 1468 | 1469 | 1470 | 1471 | 1472 | 1473 | 1474 | 1475 | 1476 | 1477 | 1478 | 1479 | 1480 | 1481 | 1482 | 1483 | 1484 | 1485 | 1486 | 1487 | 1488 | 1489 | 1490 | 1491 | 1492 | 1493 | 1494 | 1495 | 1496 | 1497 | 1498 | 1499 | 1500 | 1501 | 1502 | 1503 | 1504 | 1505 | 1506 | 1507 | 1508 | 1509 | 1510 | 1511 | 1512 | 1513 | 1514 | 1515 | 1516 | 1517 | 1518 | 1519 | 1520 | 1521 | 1522 | 1523 | 1524 | 1525 | 1526 | 1527 | 1528 | 1529 | 1530 | 1531 | 1532 | 1533 | 1534 | 1535 | 1536 | 1537 | 1538 | 1539 | 1540 | 1541 | 1542 | 1543 | 1544 | 1545 | 1546 | 1547 | 1548 | 1549 | 1550 | 1551 | 1552 | 1553 | 1554 | 1555 | 1556 | 1557 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-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Table No. 3

Cotton Farming Area:
Acreage and Production of Principal Crops
(000 omitted)

| | 1839 | 1849 | 1859 | 1869 | 1879 | 1889 | 1899 | 1909 | 1919 | 1929 | 1939 |
|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| Corn | | | | | | | | | | | |
| a. | - | - | - | - | 1,190 | 1,186 | 1,461 | 1,327 | 1,439 | 1,076 | 1,252 |
| bu. | 11,901 | 14,982 | 14,368 | 9,002 | 14,652 | 14,651 | 16,448 | 16,601 | 21,816 | 15,667 | 16,486 |
| Cotton | | | | | | | | | | | |
| a. | - | - | - | - | 975 | 1,374 | 1,523 | 1,883 | 2,048 | 1,890 | 993 |
| lb. | 47,843 | 46,974 | 59,800 | 39,739 | 177,197 | 248,502 | 282,641 | 401,487 | 535,511 | 475,457 | 334,542 |
| Oats | | | | | | | | | | | |
| a. | - | - | - | - | 326 | 356 | 155 | 225 | 99 | 59 | 201 |
| bu. | 1,179 | 2,750 | 894 | 1,389 | 2,504 | 2,799 | 1,224 | 2,974 | 1,390 | 1,258 | 4,424 |
| Wheat | | | | | | | | | | | |
| a. | - | - | - | - | 408 | 355 | 466 | 211 | 253 | 157 | 307 |
| bu. | 1,537 | 1,414 | 2,623 | - | 2,469 | 2,136 | 2,751 | 1,538 | 1,826 | 1,563 | 3,891 |
| Hay | | | | | | | | | | | |
| a. | - | - | - | - | 20 | 45 | - | 157 | - | 116 | 313 |
| tons | 39 | - | 50 | - | 20 | 54 | - | 171 | - | 133 | 306 |

Table No. 4

Acres of Improved Land
(000 omitted)

| | <u>1850</u> | <u>1860</u> | <u>1870</u> | <u>1880</u> | <u>1890</u> | <u>1900</u> | <u>1910</u> | <u>1920</u> | <u>1929</u> | <u>1939</u> |
|-----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Tobacco and Mixed
Farming Area | 4,418 | 4,556 | 3,640 | 3,590 | 4,260 | 4,481 | 4,516 | 4,130 | 4,105 | 3,984 |
| Cotton Plantation
Area | 4,033 | 4,255 | 2,544 | 3,494 | 4,032 | 3,749 | 4,063 | 3,893 | 3,369 | 3,121 |
| Cotton Farming
Area | 2,778 | 3,111 | 2,582 | 3,590 | 4,469 | 4,851 | 5,177 | 5,109 | 5,272 | 4,942 |

Table No. 5

Rural Population¹
1790-1860

| | <u>1790</u> | <u>1800</u> | <u>1810</u> | <u>1820</u> | <u>1830</u> | <u>1840</u> | <u>1850</u> | <u>1860</u> |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Tobacco and Mixed Farming Area | 305,272 | 363,757 | 407,856 | 488,988 | 502,435 | 495,261 | 533,529 | 576,682 |
| Cotton Plantation Area | 105,912 | 162,503 | 241,180 | 307,979 | 393,569 | 415,286 | 456,063 | 439,780 |
| Cotton Farming Area | 88,394 | 147,720 | 179,080 | 217,705 | 323,668 | 363,264 | 441,201 | 493,370 |

1. Total population less towns 2,500 and over.

Table No. 5a

Rural Population¹
1870-1940

| | <u>1870</u> | <u>1880</u> | <u>1890</u> | <u>1900</u> | <u>1910</u> | <u>1920</u> | <u>1930</u> | <u>1940</u> |
|-----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Tobacco and Mixed
Farming Area | 586,278 | 724,595 | 757,865 | 826,332 | 865,783 | 956,153 | 1,002,949 | 1,085,340 |
| Cotton Plantation
Area | 434,649 | 567,114 | 594,823 | 632,989 | 677,791 | 681,060 | 550,321 | 539,340 |
| Cotton Farming
Area | 520,689 | 710,794 | 817,945 | 968,386 | 1,091,255 | 1,170,468 | 1,256,954 | 1,365,700 |

1. Total population less towns 2,500 and over.

Appendix III

MAPS

The information on soils on Map No. 1, Generalized Soils and Crop Area Map, is based on the Atlas of American Agriculture, Soils, Williams and Mann, Agricultural Classification and Evaluation of North Carolina Soils, and on the soil survey reports cited in the bibliography. The differentiation between crop areas is discussed in the text, Chapters III and V.

Map No. 2, Southern Piedmont, Location Map is intended for general reference purposes. The outlines of all counties within the area of the map are shown, but only the counties of the Southern Piedmont Region are named.¹ The information on pre-settlement sites and explorations is from various sources cited in Chapter I.

1. The base map used for this map and the following statistical maps of the region is United States Department of Interior, Geological Survey, United States, scale 1:2,500,000, approximately 1 in. to 40 mi. (edition of 1932, reprinted 1947).

III 116050A

[illegible]

I have been asked by the United States Department of Interior, Bureau of Land Management, to provide information regarding the status of the land owned by the United States in the area of the proposed project. The land is located in the State of California, and is part of the National Forest System. The land is currently being managed by the United States Forest Service, which is a part of the Department of Agriculture.

The data on pre-1860 railroads are from Colton's New Railroad and County Map of the United States, the Canadas, &c. (1860), scale, approximately 1 in. to 50 mi. More recent railway lines are taken directly from the base map.

The statistical maps of the Southern Piedmont were compiled from the census. Maps No. 3 and 6 show percentage of increase in rural population by county from 1790 to 1860 and from 1860 to 1940 respectively. The rural population is that part of the population living outside of incorporated places, reported separately in the census, having over 2,500 inhabitants. In cases of changes in the area of counties between the first and last dates represented by the map, adjustments were made by estimating the population at census dates after the first on the basis of the area as it was at the first date.

Maps No. 4 and 7 show the trends in rural population growth by county in the two periods 1790-1860 and 1860-1940. Some counties experienced continuous population growth from decade to decade. In other counties there were periods of growth followed by periods of decline. Some of these latter counties had an overall increase from the first period to the last, although the maximum population might have been attained at some intermediate census date. The census date of the maximum population, for counties having irregular growth, is termed the "peak year" on the maps. The following tables give examples of different patterns of growth. The figure representing maximum population is underlined. Although a few of the counties experienced declines in rural

... 1 in. to 2 in. ... the recent railway line

1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725 2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738 2739 2740 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752 2753 2754 2755 2756 2757 2758 2759 2760 2761 2762 2763 2764 2765 2766 2767 2768 2769 2770 2771 2772 2773 2774 2775 2776 2777 2778 2779 2780 2781 2782 2783 2784 2785 2786 2787 2788 2789 2790 2791 2792 2793 2794 2795 2796 2797 2798 2799 2800 2801 2802 2803 2804 2805 2806 2807 2808

The statement made by the Southern Railway was that

Table No. 5 and 6 show percentage of increase in

...The tunnel population is that part of the pop-

By the same means, having over 2,500 inhabitants. In cases of

...in the area of conflict between the first and last dates

1945

Received 11/11/2010; revised 12/11/2010; accepted 12/11/2010.

The following table shows the number of persons who have been convicted of crimes in the State of New York since 1900.

population between 1860 and 1940 this is not indicated on Map No. 7. It is shown instead on Map No. 6, Rural Population Growth, 1860-1940. This method of representing patterns of population growth is similar to one devised by Stanley D. Dodge.²

Continuous Growth, 1790-1860: Pittsylvania County, Va.

| <u>1790</u> | <u>1800</u> | <u>1810</u> | <u>1820</u> | <u>1830</u> | <u>1840</u> | <u>1850</u> | <u>1860</u> |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| 11579 | 12697 | 17172 | 21323 | 26034 | 26398 | 28796 | <u>32104</u> |

Irregular Growth, 1790-1860, Peak Year, 1820: Putnam Co., Ga.

| | | | | | | | |
|---|---|-------|--------------|-------|-------|-------|-------|
| - | - | 10029 | <u>15475</u> | 13261 | 10260 | 10794 | 10125 |
|---|---|-------|--------------|-------|-------|-------|-------|

Irregular Growth, 1860-1940, Peak Year, 1940: Greenville Co., S. C.

| <u>1860</u> | <u>1870</u> | <u>1880</u> | <u>1890</u> | <u>1900</u> | <u>1910</u> | <u>1920</u> | <u>1930</u> | <u>1940</u> |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| 21892 | 19505 | 31336 | 35703 | 41630 | 52636 | 65371 | 87855 | <u>99497</u> |

Population Decline, 1860-1940, Peak Year, 1910: Fairfield Co., S. C.

| | | | | | | | | |
|-------|-------|-------|-------|-------|--------------|-------|-------|-------|
| 22111 | 19888 | 27765 | 28599 | 29425 | <u>29442</u> | 27159 | 23287 | 21006 |
|-------|-------|-------|-------|-------|--------------|-------|-------|-------|

Map No. 8, Improved Land: Peak Census Year, 1860-1940, shows the period in which the acreage of improved land was greatest. It did not appear advisable to make maps of improved land on the same basis as those of rural population. The data for 1939 cannot be adjusted accurately to be comparable to that of earlier dates. No counties had continuous increase in improved land from decade to decade, and many had more improved land even in 1860 than in 1920 or 1929.

². Stanley D. Dodge, "A Study of Population Regions in New England on a New Basis," Annals of the Association of American Geographers, v. 25 (Dec. 1935), pp. 197-210.

100-1000. This range of population is shown in the map. It is shown in the map No. 6, Rural Population Growth, 1950-1960. This is not indicated on map No. 6.

1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718

[illegible]

... of rural population. The data for 1959 cannot be

adjusted downwardly as he happened to find it selling below the market and upwardly as he happened to find it selling above the market. The result was that the market was not in equilibrium and the price of the commodity was not stable.

1. The following is a list of the names of the persons who have been appointed to the various committees of the Board of Directors of the American Telephone and Telegraph Company, for the year ending December 31, 1910:

In the period 1790-1860 the northeastern end of the Southern Piedmont was an area of out-migration with only small increase in rural population, whereas the southwestern parts of the region, secured from the Indians after 1790, experience great over-all growth. On the other hand, much of the southwestern portion was similar to the northeast in the pattern of growth: The maximum population was attained in the 1820's, 1830's, or 1840's, after which population declined as farmers migrated to fresher lands. Between these two extremes, in the Carolinas, the increase in population was large and migration was not sufficient to interrupt the continuous growth. The plantation areas in Georgia and to a lesser extent the areas of large land holdings in Virginia experienced more irregular growth than the areas of smaller farms, as seen by a comparison of the population maps with Map No. 5, showing percentage of farms of less than 100 acres in 1860.

In the period 1860-1940 the former plantation areas continued to be the ones having the smallest and most irregular growth. The amount of agricultural land in these areas remained stationary or declined. (See Map No. 8.) To the northeast this decline in improved land was associated with the cultivation of bright tobacco. In the cotton areas the decline in many plantation counties dated from 1860, but was accelerated greatly by the boll weevil invasion and by the depressions of the early 1920's and the 1930's. The central and western North Carolina Piedmont, the upper counties in South Carolina, and several counties in the upper part of the region in Georgia had large increases in rural population. These were also the areas in which most of the new urban centers and

[illegible]

industries were located.

The old cotton plantation areas of Georgia and South Carolina and the old tobacco areas of Virginia have been areas of distress since the early nineteenth century, with the exception of a few periods such as the decade 1850-1860 and the era 1900-1919. Unprofitable agriculture, a lack of alternative enterprises, excessive migration, land abandonment, erosion, and deterioration of farm values have been characteristic of these areas. The plantation portions of Georgia and South Carolina included much land that was classed as submarginal in the early 1930's, having some of the lowest evaluations of land and buildings per acre in the southeastern states.³ Central North Carolina and the upper portions of the South Carolina and Georgia Piedmont, on the other hand, have experienced population growth almost continuously. They were general farming areas of no marked opulence before the Civil War. After the war, the necessary adjustments to the new farming conditions were not so violent as in the plantation areas and agriculture was more profitable. Rising industries also furnished employment to excess farm population. Soil erosion here has made serious inroads, but farming has been relatively prosperous and alternative enterprises have made the consequences seem less serious.

3. Howard W. Odum, Southern Regions of the United States. (Chapel Hill, N. C., 1936), pp. 160, 222.

SOUTHERN PIEDMONT AND CROP AREA MAP

SOILS

Derived from:

Granite, Gneiss and Mica Schist

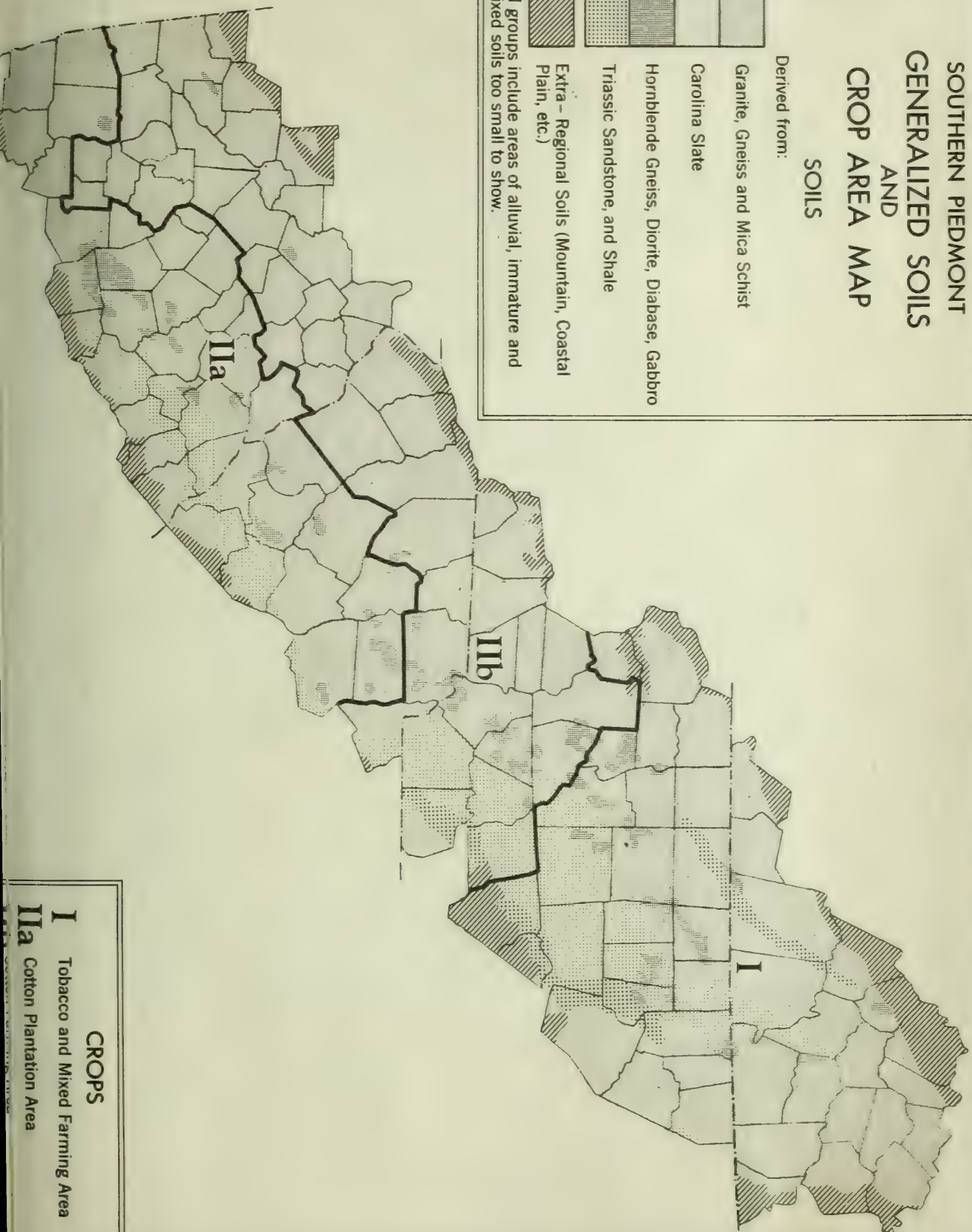
Carolina Slate

Hornblende Gneiss, Diorite, Diabase, Gabbro

Triassic Sandstone, and Shale

Extra - Regional Soils (Mountain, Coastal Plain, etc.)

All groups include areas of alluvial, immature and mixed soils too small to show.



CROPS

I Tobacco and Mixed Farming Area

IIa Cotton Plantation Area

SOUTHERN PIEDMONT LOCATION MAP

SELECTED RAILWAYS

— Built to 1860

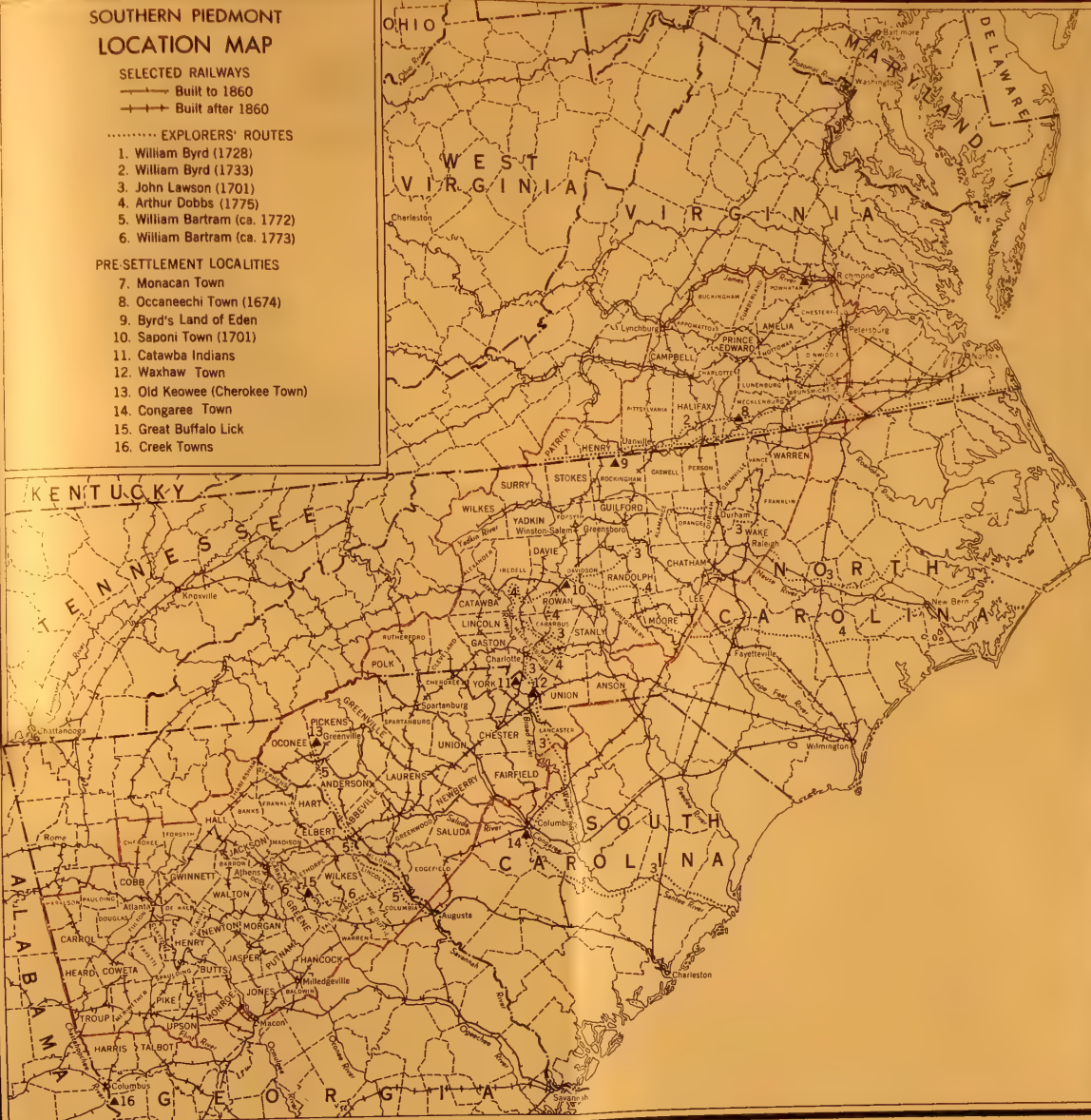
— Built after 1860

EXPLORERS' ROUTES

1. William Byrd (1728)
2. William Byrd (1733)
3. John Lawson (1701)
4. Arthur Dobbs (1775)
5. William Bartram (ca. 1772)
6. William Bartram (ca. 1773)

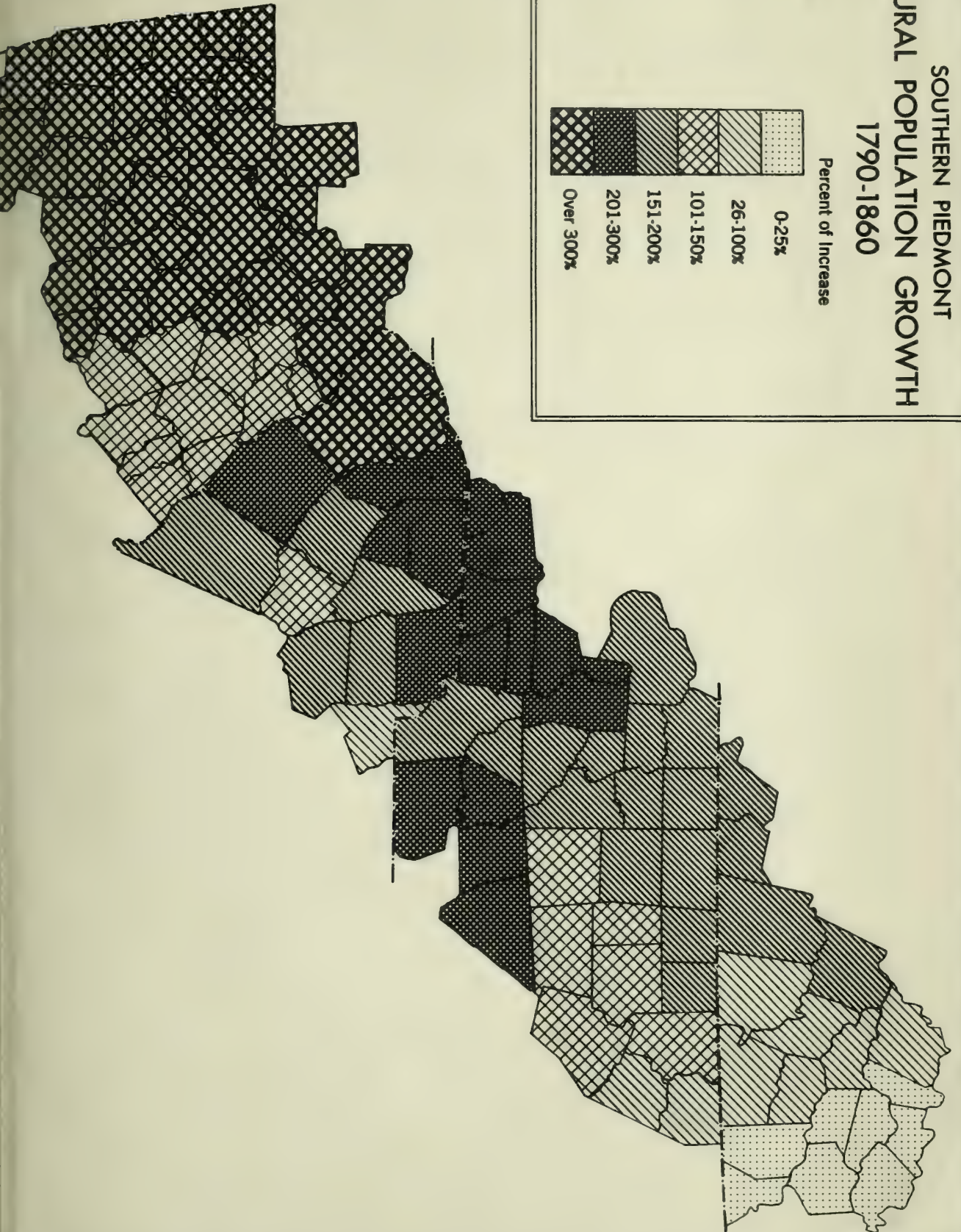
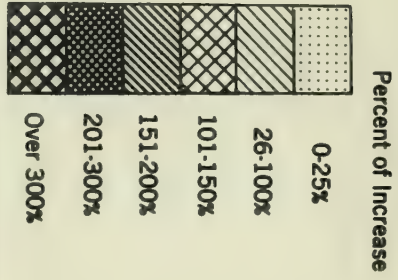
PRE-SETTLEMENT LOCALITIES

7. Monacan Town
8. Occaneechi Town (1674)
9. Byrd's Land of Eden
10. Saponi Town (1701)
11. Catawba Indians
12. Waxhaw Town
13. Old Keowee (Cherokee Town)
14. Congaree Town
15. Great Buffalo Lick
16. Creek Towns



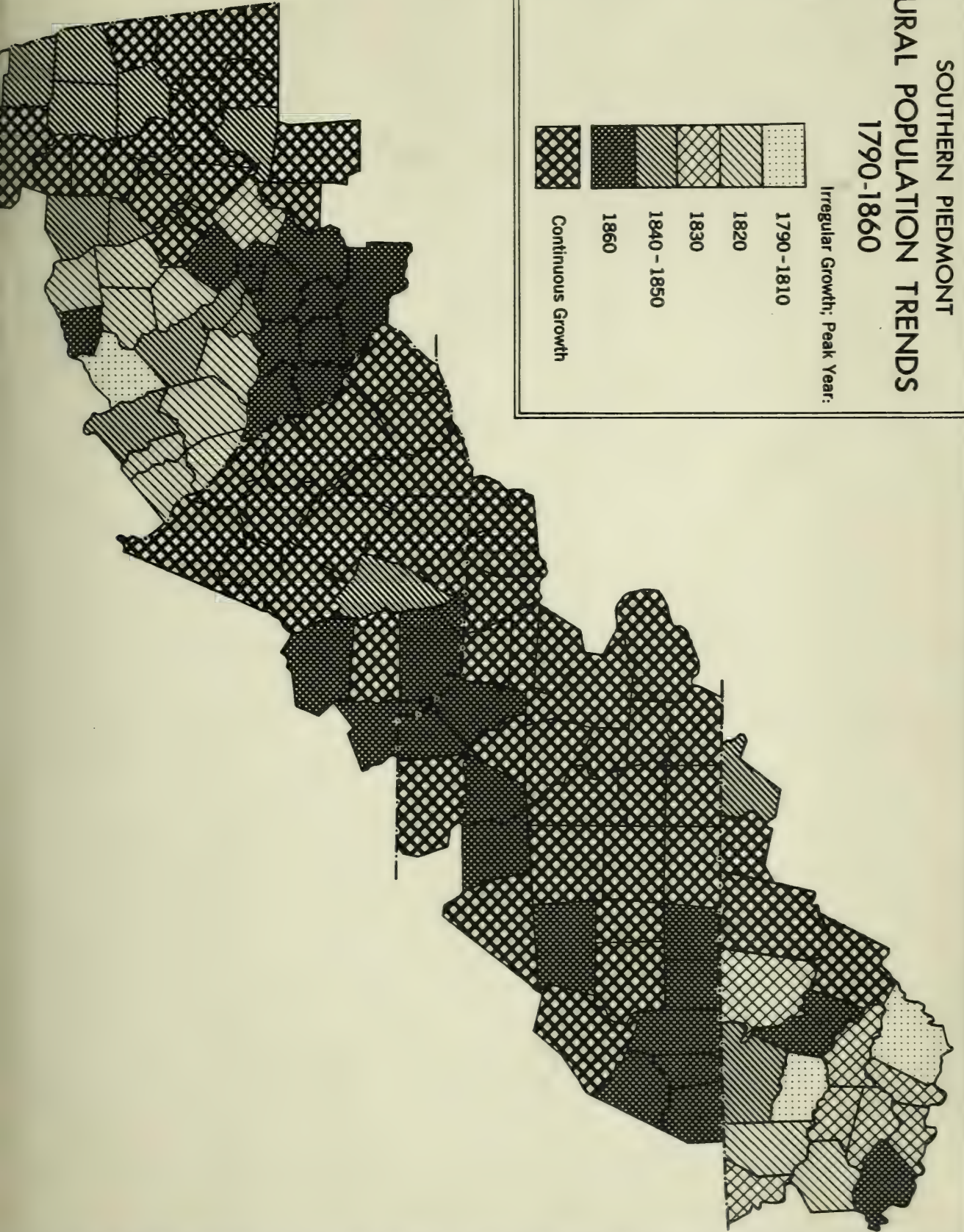
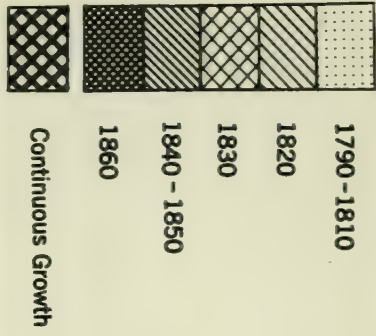


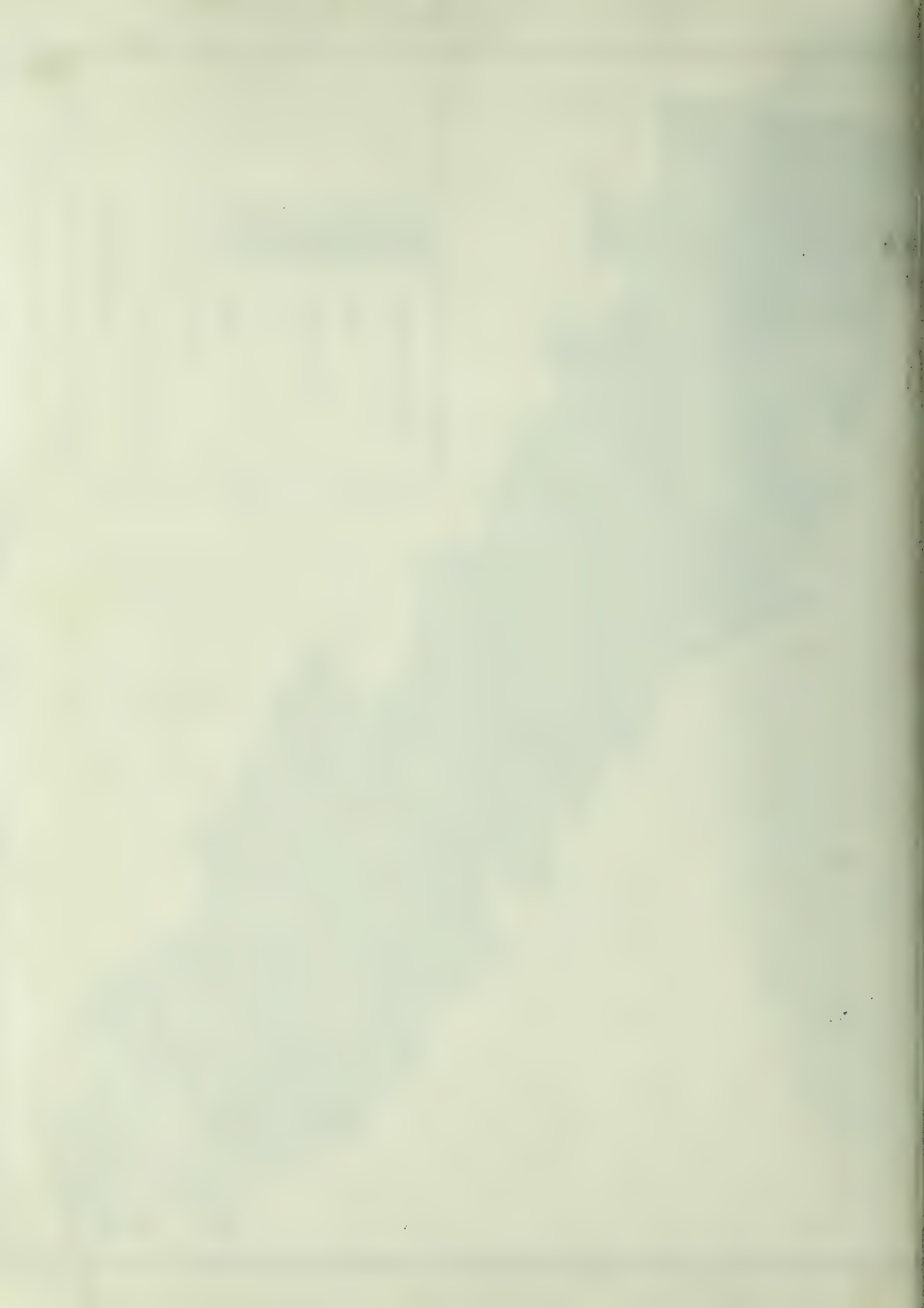
SOUTHERN PIEDMONT
RURAL POPULATION GROWTH
1790-1860



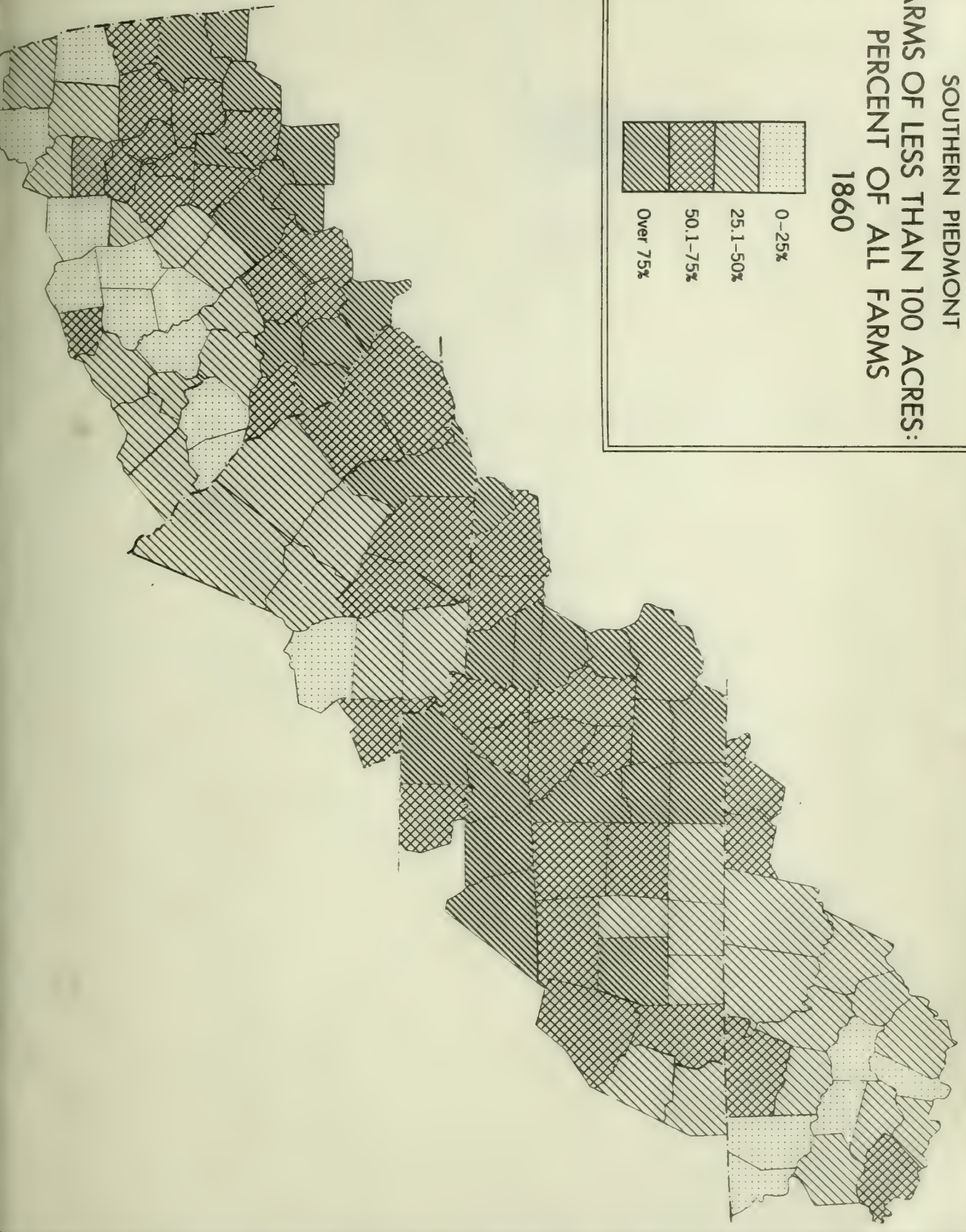
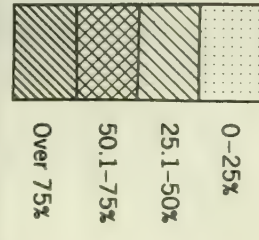
SOUTHERN PIEDMONT
RURAL POPULATION TRENDS
1790-1860

Irregular Growth; Peak Year:

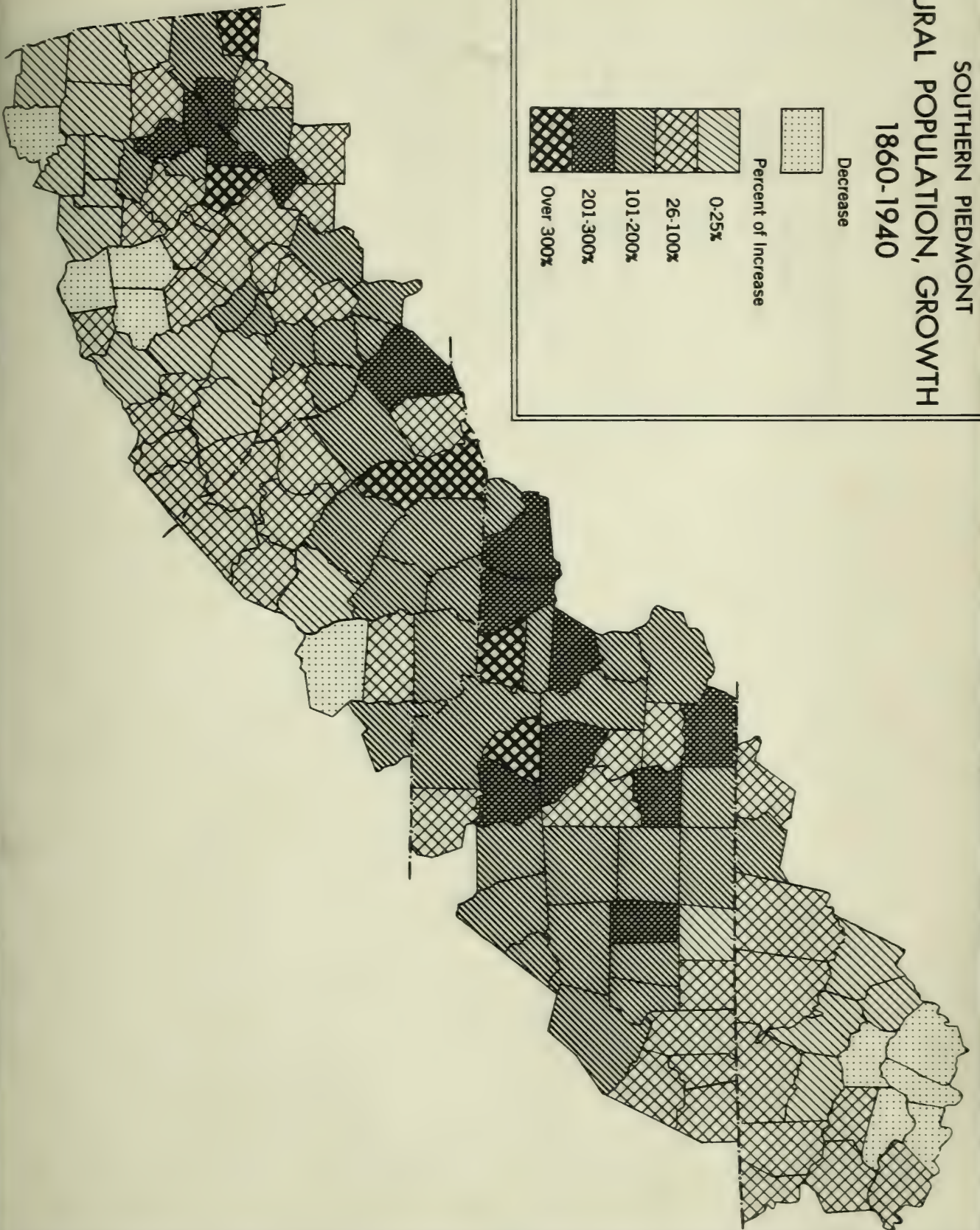




SOUTHERN PIEDMONT
FARMS OF LESS THAN 100 ACRES:
PERCENT OF ALL FARMS
1860



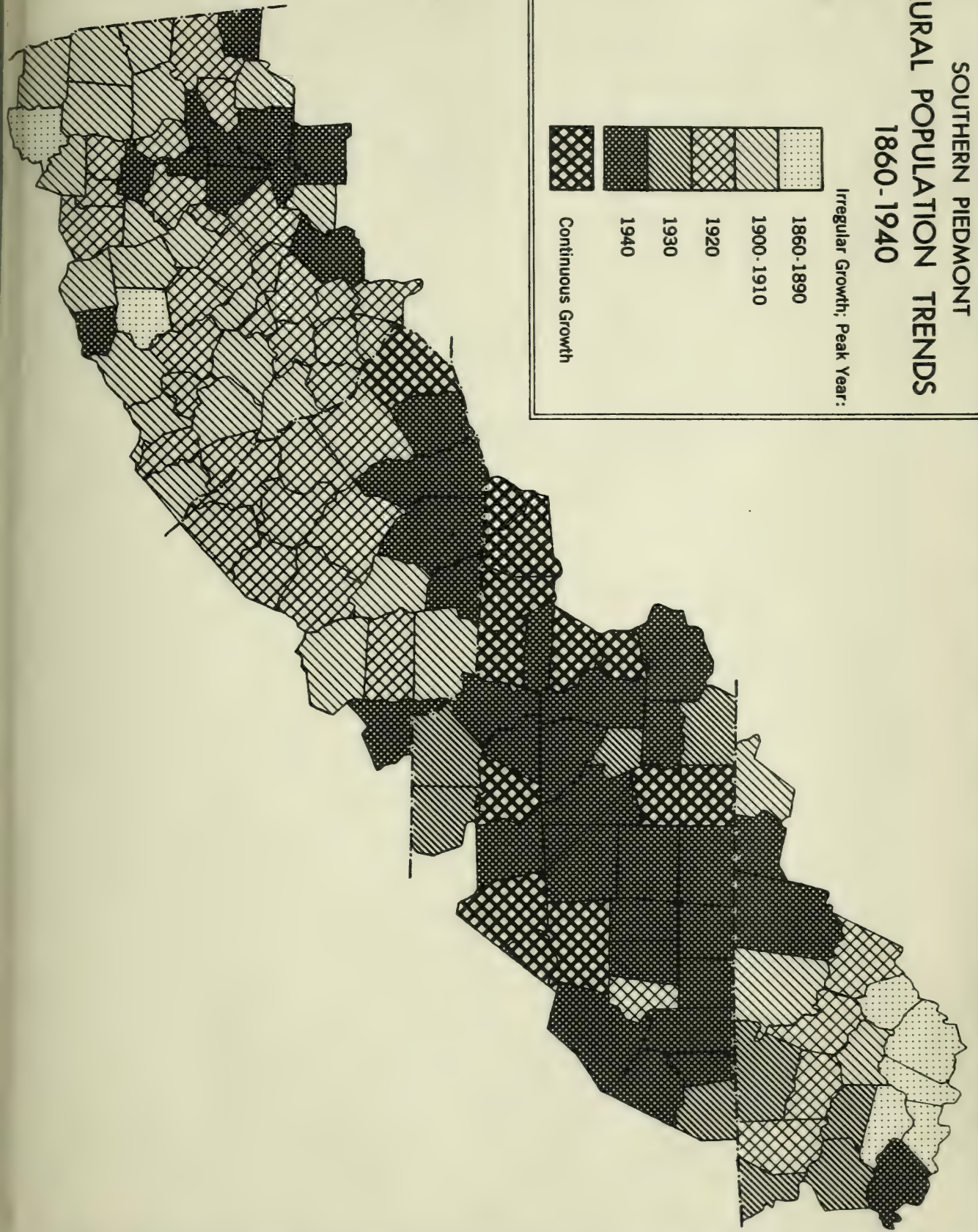
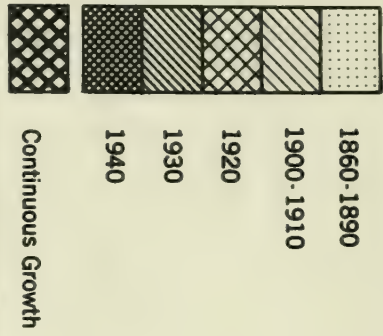
SOUTHERN PIEDMONT
RURAL POPULATION, GROWTH
1860-1940





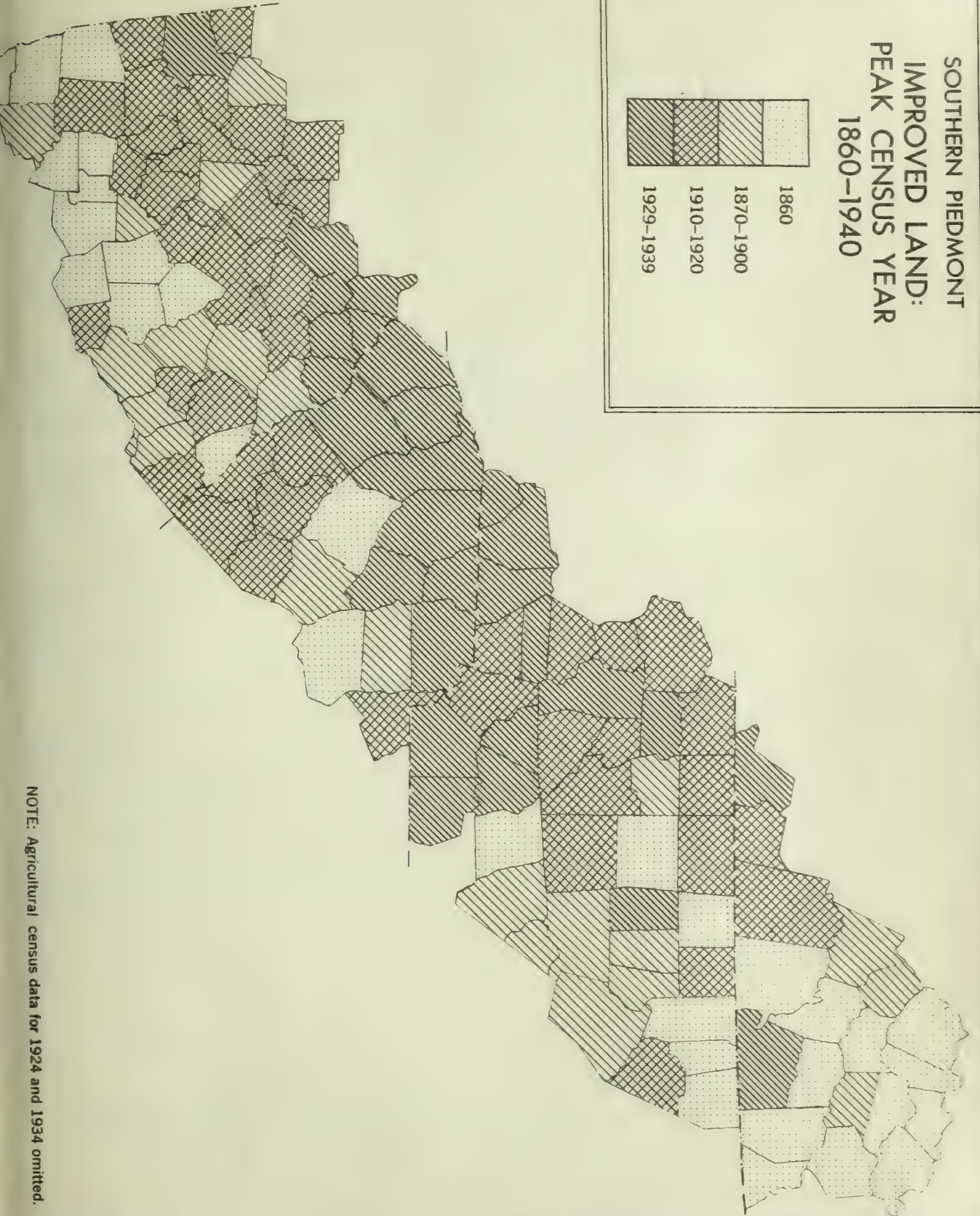
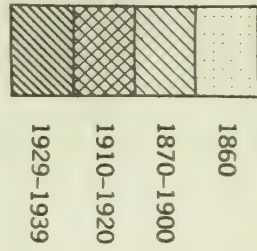
SOUTHERN PIEDMONT
RURAL POPULATION TRENDS
1860-1940

Irregular Growth, Peak Year:





SOUTHERN PIEDMONT
IMPROVED LAND:
PEAK CENSUS YEAR
1860-1940



NOTE: Agricultural census data for 1924 and 1934 omitted.

Appendix IV

LIVESTOCK, LIVESTOCK PRODUCTS AND CROPS

Per Capita Holdings and Production

Appendix IV

LISTING OF DOCUMENTS RECEIVED AND SENT

FOR CAPTAIN HOLDINGS AND PRODUCTION

LIVESTOCK, LIVESTOCK PRODUCTS AND CROPS

Per Capita¹ Holdings and ProductionBuckingham Co., Va.

| | | <u>1839</u> | <u>1859</u> | <u>1889</u> | <u>1909</u> | <u>1929</u> | <u>1939</u> |
|-------------------|-------|-------------|-------------|-------------|-------------|-------------|-------------|
| Livestock: | | | | | | | |
| Milk cows | | - | .16 | .16 | .20 | .21 | .21 |
| Sheep | | .77 | .48 | .29 | .08 | .24 | .06 |
| Swine | | 1.18 | .81 | .57 | .41 | .41 | .31 |
| Milk sold | gals. | - | - | - | .08 | 3.94 | 9.14 |
| Butter made | lb. | - | 6.08 | 11.21 | 22.46 | 21.69 | 15.95 |
| Crops: | | | | | | | |
| Corn | bu. | 23.36 | 19.18 | 12.90 | 20.90 | 24.79 | 23.65 |
| Wheat | bu. | 8.98 | 7.55 | 3.88 | 4.47 | 7.05 | 6.27 |
| Oats | bu. | 12.08 | 11.70 | 3.12 | 2.14 | .40 | .44 |
| Tobacco | lb. | 130.55 | 314.02 | 60.88 | 264.08 | 151.40 | 125.42 |
| Hay | tons | .04 | .06 | .24 | .39 | .50 | .80 |
| Peas & beans | bu. | - | .28 | .03 | .04 | .24 | .32 |
| Sweet potatoes | bu. | 1.09 | .80 | 1.39 | .99 | .78 | 1.43 |
| Peach orchards | trees | - | - | .63 | 1.30 | .91 | .95 |

1. Per capita of the population residing outside of cities, towns and villages reported in the census.

STATISTICAL BUREAU OF THE DISTRICT OF COLUMBIA THE DISTRICT OF COLUMBIA AND TERRITORIES

POPULATION, 1900

| POPULATION, 1900 | | | | | | Total |
|------------------|---------|---------|----------|-------|--------------|---------|
| White | Colored | Chinese | Japanese | Other | Foreign born | |
| 11,000 | 1,000 | 100 | 100 | 100 | 100 | 12,400 |
| 12,000 | 1,000 | 100 | 100 | 100 | 100 | 13,400 |
| 13,000 | 1,000 | 100 | 100 | 100 | 100 | 14,400 |
| 14,000 | 1,000 | 100 | 100 | 100 | 100 | 15,400 |
| 15,000 | 1,000 | 100 | 100 | 100 | 100 | 16,400 |
| 16,000 | 1,000 | 100 | 100 | 100 | 100 | 17,400 |
| 17,000 | 1,000 | 100 | 100 | 100 | 100 | 18,400 |
| 18,000 | 1,000 | 100 | 100 | 100 | 100 | 19,400 |
| 19,000 | 1,000 | 100 | 100 | 100 | 100 | 20,400 |
| 20,000 | 1,000 | 100 | 100 | 100 | 100 | 21,400 |
| 21,000 | 1,000 | 100 | 100 | 100 | 100 | 22,400 |
| 22,000 | 1,000 | 100 | 100 | 100 | 100 | 23,400 |
| 23,000 | 1,000 | 100 | 100 | 100 | 100 | 24,400 |
| 24,000 | 1,000 | 100 | 100 | 100 | 100 | 25,400 |
| 25,000 | 1,000 | 100 | 100 | 100 | 100 | 26,400 |
| 26,000 | 1,000 | 100 | 100 | 100 | 100 | 27,400 |
| 27,000 | 1,000 | 100 | 100 | 100 | 100 | 28,400 |
| 28,000 | 1,000 | 100 | 100 | 100 | 100 | 29,400 |
| 29,000 | 1,000 | 100 | 100 | 100 | 100 | 30,400 |
| 30,000 | 1,000 | 100 | 100 | 100 | 100 | 31,400 |
| 31,000 | 1,000 | 100 | 100 | 100 | 100 | 32,400 |
| 32,000 | 1,000 | 100 | 100 | 100 | 100 | 33,400 |
| 33,000 | 1,000 | 100 | 100 | 100 | 100 | 34,400 |
| 34,000 | 1,000 | 100 | 100 | 100 | 100 | 35,400 |
| 35,000 | 1,000 | 100 | 100 | 100 | 100 | 36,400 |
| 36,000 | 1,000 | 100 | 100 | 100 | 100 | 37,400 |
| 37,000 | 1,000 | 100 | 100 | 100 | 100 | 38,400 |
| 38,000 | 1,000 | 100 | 100 | 100 | 100 | 39,400 |
| 39,000 | 1,000 | 100 | 100 | 100 | 100 | 40,400 |
| 40,000 | 1,000 | 100 | 100 | 100 | 100 | 41,400 |
| 41,000 | 1,000 | 100 | 100 | 100 | 100 | 42,400 |
| 42,000 | 1,000 | 100 | 100 | 100 | 100 | 43,400 |
| 43,000 | 1,000 | 100 | 100 | 100 | 100 | 44,400 |
| 44,000 | 1,000 | 100 | 100 | 100 | 100 | 45,400 |
| 45,000 | 1,000 | 100 | 100 | 100 | 100 | 46,400 |
| 46,000 | 1,000 | 100 | 100 | 100 | 100 | 47,400 |
| 47,000 | 1,000 | 100 | 100 | 100 | 100 | 48,400 |
| 48,000 | 1,000 | 100 | 100 | 100 | 100 | 49,400 |
| 49,000 | 1,000 | 100 | 100 | 100 | 100 | 50,400 |
| 50,000 | 1,000 | 100 | 100 | 100 | 100 | 51,400 |
| 51,000 | 1,000 | 100 | 100 | 100 | 100 | 52,400 |
| 52,000 | 1,000 | 100 | 100 | 100 | 100 | 53,400 |
| 53,000 | 1,000 | 100 | 100 | 100 | 100 | 54,400 |
| 54,000 | 1,000 | 100 | 100 | 100 | 100 | 55,400 |
| 55,000 | 1,000 | 100 | 100 | 100 | 100 | 56,400 |
| 56,000 | 1,000 | 100 | 100 | 100 | 100 | 57,400 |
| 57,000 | 1,000 | 100 | 100 | 100 | 100 | 58,400 |
| 58,000 | 1,000 | 100 | 100 | 100 | 100 | 59,400 |
| 59,000 | 1,000 | 100 | 100 | 100 | 100 | 60,400 |
| 60,000 | 1,000 | 100 | 100 | 100 | 100 | 61,400 |
| 61,000 | 1,000 | 100 | 100 | 100 | 100 | 62,400 |
| 62,000 | 1,000 | 100 | 100 | 100 | 100 | 63,400 |
| 63,000 | 1,000 | 100 | 100 | 100 | 100 | 64,400 |
| 64,000 | 1,000 | 100 | 100 | 100 | 100 | 65,400 |
| 65,000 | 1,000 | 100 | 100 | 100 | 100 | 66,400 |
| 66,000 | 1,000 | 100 | 100 | 100 | 100 | 67,400 |
| 67,000 | 1,000 | 100 | 100 | 100 | 100 | 68,400 |
| 68,000 | 1,000 | 100 | 100 | 100 | 100 | 69,400 |
| 69,000 | 1,000 | 100 | 100 | 100 | 100 | 70,400 |
| 70,000 | 1,000 | 100 | 100 | 100 | 100 | 71,400 |
| 71,000 | 1,000 | 100 | 100 | 100 | 100 | 72,400 |
| 72,000 | 1,000 | 100 | 100 | 100 | 100 | 73,400 |
| 73,000 | 1,000 | 100 | 100 | 100 | 100 | 74,400 |
| 74,000 | 1,000 | 100 | 100 | 100 | 100 | 75,400 |
| 75,000 | 1,000 | 100 | 100 | 100 | 100 | 76,400 |
| 76,000 | 1,000 | 100 | 100 | 100 | 100 | 77,400 |
| 77,000 | 1,000 | 100 | 100 | 100 | 100 | 78,400 |
| 78,000 | 1,000 | 100 | 100 | 100 | 100 | 79,400 |
| 79,000 | 1,000 | 100 | 100 | 100 | 100 | 80,400 |
| 80,000 | 1,000 | 100 | 100 | 100 | 100 | 81,400 |
| 81,000 | 1,000 | 100 | 100 | 100 | 100 | 82,400 |
| 82,000 | 1,000 | 100 | 100 | 100 | 100 | 83,400 |
| 83,000 | 1,000 | 100 | 100 | 100 | 100 | 84,400 |
| 84,000 | 1,000 | 100 | 100 | 100 | 100 | 85,400 |
| 85,000 | 1,000 | 100 | 100 | 100 | 100 | 86,400 |
| 86,000 | 1,000 | 100 | 100 | 100 | 100 | 87,400 |
| 87,000 | 1,000 | 100 | 100 | 100 | 100 | 88,400 |
| 88,000 | 1,000 | 100 | 100 | 100 | 100 | 89,400 |
| 89,000 | 1,000 | 100 | 100 | 100 | 100 | 90,400 |
| 90,000 | 1,000 | 100 | 100 | 100 | 100 | 91,400 |
| 91,000 | 1,000 | 100 | 100 | 100 | 100 | 92,400 |
| 92,000 | 1,000 | 100 | 100 | 100 | 100 | 93,400 |
| 93,000 | 1,000 | 100 | 100 | 100 | 100 | 94,400 |
| 94,000 | 1,000 | 100 | 100 | 100 | 100 | 95,400 |
| 95,000 | 1,000 | 100 | 100 | 100 | 100 | 96,400 |
| 96,000 | 1,000 | 100 | 100 | 100 | 100 | 97,400 |
| 97,000 | 1,000 | 100 | 100 | 100 | 100 | 98,400 |
| 98,000 | 1,000 | 100 | 100 | 100 | 100 | 99,400 |
| 99,000 | 1,000 | 100 | 100 | 100 | 100 | 100,400 |

1. For details of the population residing outside of cities
 towns and villages reported in the census.

LIVESTOCK, LIVESTOCK PRODUCTS AND CROPS

Per Capita¹ Holdings and ProductionCaswell Co., N.C.1839 1859 1889 1909 1929 1939

Livestock:

| | | | | | | | |
|-------------|------|------|------|------|-------|-------|-------|
| Milk cows | | - | .17 | .10 | .17 | .15 | .17 |
| Sheep | | .68 | .37 | .09 | .02 | .00 | .00 |
| Swine | | 1.82 | 1.07 | .43 | .40 | .25 | .25 |
| Milk sold | gal. | - | - | - | .40 | 1.49 | 2.47 |
| Butter made | lb. | - | 4.82 | 9.00 | 21.44 | 22.84 | 23.14 |

Crops:

| | | | | | | | |
|----------------|-------|--------|--------|--------|--------|--------|--------|
| Corn | bu. | 34.67 | 24.87 | 15.21 | 18.03 | 15.49 | 16.76 |
| Wheat | bu. | 5.35 | 6.79 | 4.56 | 5.44 | 3.52 | 3.14 |
| Oats | bu. | 8.29 | 7.20 | 4.28 | 1.43 | .03 | .11 |
| Tobacco | lb. | 249.49 | 284.03 | 163.85 | 445.70 | 509.11 | 661.48 |
| Hay | tons | .01 | .02 | .10 | .15 | .08 | .35 |
| Peas & beans | bu. | - | .51 | .01 | .04 | .05 | .04 |
| Sweet potatoes | bu. | 1.05 | 2.26 | 1.84 | 2.36 | 1.28 | 1.82 |
| Peach orchards | trees | - | - | 1.94 | 1.78 | .80 | .95 |

1. Per capita of the population residing outside of cities, towns and villages reported in the census.

INVESTMENT, FINANCIAL PROGRESS AND STATUS
FOR 1914-15, 1915-16, 1916-17, 1917-18, 1918-19, 1919-20

TABLE 1

| 1914-15 | 1915-16 | 1916-17 | 1917-18 | 1918-19 | 1919-20 | |
|---------|---------|---------|---------|---------|---------|-------------|
| 71. | 21. | 11. | 11. | 71. | - | Investment |
| 10. | 10. | 10. | 10. | 10. | 10. | Profit |
| 10. | 10. | 10. | 10. | 10.1 | 10.1 | Income |
| 10.1 | 10.1 | 10. | - | - | - | Net profit |
| 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | - | Net loss |
| 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | Capital |
| 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | Debt |
| 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | Equity |
| 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | Assets |
| 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | Liabilities |
| 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | Net worth |
| 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | Net income |
| 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | Net loss |
| 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | Net profit |
| 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | Net loss |
| 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | Net profit |
| 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | Net loss |

Notes: 1. The figures of the preceding column are in millions of dollars.
2. The figures of the preceding column are in millions of dollars.

LIVESTOCK, LIVESTOCK PRODUCTS AND CROPS

Per Capita¹ Holdings and ProductionForsyth Co., N.C.

| | | <u>1839</u> | <u>1859</u> | <u>1889</u> | <u>1909</u> | <u>1929</u> | <u>1939</u> |
|-------------------|-------|-------------|-------------|-------------|-------------|-------------|-------------|
| Livestock: | | | | | | | |
| Milk cows | | - | .20 | .16 | .19 | .15 | .11 |
| Sheep | | - | .50 | .12 | .02 | .01 | .00 |
| Swine | | - | 1.49 | .51 | .02 | .18 | .10 |
| Milk sold | gal. | - | - | - | 3.60 | 18.10 | 16.93 |
| Butter made | lb. | - | 5.88 | 12.81 | 20.45 | 17.44 | 12.05 |
| Crops: | | | | | | | |
| Corn | bu. | - | 25.04 | 14.78 | 16.80 | 13.34 | 10.61 |
| Wheat | bu. | - | 14.79 | 7.90 | 8.54 | 4.82 | 2.86 |
| Oats | bu. | - | 4.80 | 5.29 | 2.10 | 1.70 | 2.23 |
| Tobacco | lb. | - | 43.44 | 95.64 | 152.97 | 197.51 | 146.59 |
| Hay | tons | - | .43 | .39 | .40 | .30 | .35 |
| Peas & beans | bu. | - | .18 | .02 | .05 | .03 | .05 |
| Sweet potatoes | bu. | - | 1.65 | 1.52 | 1.77 | 1.65 | 1.17 |
| Peach orchards | trees | - | - | 4.44 | 1.95 | 1.14 | .96 |

1. Per capita of the population residing outside of cities, towns and villages reported in the census.

| Year | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 | |

1. The first step in the process of identifying a problem is to determine the nature of the problem. This involves a thorough understanding of the situation and the factors that are contributing to the problem. Once the nature of the problem is understood, the next step is to identify the causes of the problem. This involves a detailed analysis of the situation and the factors that are contributing to the problem. Once the causes of the problem are identified, the next step is to develop a plan of action. This involves determining the steps that need to be taken to solve the problem. Once a plan of action is developed, the next step is to implement the plan. This involves carrying out the steps that have been determined in the plan of action. Finally, the last step in the process is to evaluate the results of the plan. This involves determining whether the plan has been successful in solving the problem and whether any further action is needed.

LIVESTOCK, LIVESTOCK PRODUCTS AND CROPS

Per Capita¹ Holdings and ProductionIredell Co., N.C.

| | <u>1839</u> | <u>1859</u> | <u>1889</u> | <u>1909</u> | <u>1929</u> | <u>1939</u> |
|--|-------------|-------------|-------------|-------------|-------------|-------------|
|--|-------------|-------------|-------------|-------------|-------------|-------------|

Livestock:

| | | | | | | | |
|-------------|------|------|------|-------|-------|-------|-------|
| Milk cows | | - | .24 | .15 | .23 | .22 | .26 |
| Sheep | | .93 | .69 | .21 | .03 | .01 | .01 |
| Swine | | 2.48 | 1.68 | .63 | .46 | .26 | .18 |
| Milk sold | gal. | - | - | - | .44 | 11.23 | 27.83 |
| Butter made | lb. | - | 5.48 | 13.87 | 26.28 | 19.13 | 17.93 |

Crops:

| | | | | | | | |
|----------------|-------|-------|-------|--------|--------|--------|--------|
| Corn | bu. | 43.21 | 32.87 | 22.76 | 23.01 | 15.73 | 20.20 |
| Wheat | bu. | 6.97 | 8.80 | 6.89 | 5.55 | 6.61 | 9.89 |
| Oats | bu. | 6.27 | 4.70 | 4.72 | 2.57 | 1.15 | 4.97 |
| Cotton | lb. | 96.37 | 14.71 | 109.24 | 178.27 | 343.26 | 319.37 |
| Hay | tons | .22 | .25 | .15 | .37 | .30 | .54 |
| Peas & beans | bu. | - | .82 | .10 | .28 | .20 | .40 |
| Sweet potatoes | bu. | 1.43 | 1.46 | .79 | 1.87 | 1.28 | 1.74 |
| Peach orchards | trees | - | - | 2.21 | 3.06 | 1.74 | 1.24 |

1. Per capita of the population residing outside of cities, towns and villages reported in the census.

| Year | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 | 1908 | 1909 | 1910 | 1911 | 1912 | 1913 | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 | 1908 | 1909 | 1910 | 1911 | 1912 | 1913 | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 | |

1. For each of the populations mentioned in the table, the number of cases reported in the year.

LIVESTOCK, LIVESTOCK PRODUCTS AND CROPS

Per Capita¹ Holdings and ProductionCabarrus Co., N. C.

| | | <u>1839</u> | <u>1859</u> | <u>1889</u> | <u>1909</u> | <u>1929</u> | <u>1939</u> |
|-------------------|-------|-------------|-------------|-------------|-------------|-------------|-------------|
| Livestock: | | | | | | | |
| Milk cows | | - | .27 | .19 | .22 | .14 | .10 |
| Sheep | | .98 | .55 | .22 | .05 | .01 | .00 |
| Swine | | 2.33 | 1.74 | .62 | .34 | .16 | .08 |
| Milk sold | gal. | - | - | - | .30 | 12.37 | 13.14 |
| Butter made | lb. | - | 8.40 | 18.61 | 24.81 | 9.63 | 7.03 |
| Crops: | | | | | | | |
| Corn | bu. | 45.16 | 34.91 | 23.04 | 21.20 | 9.51 | 7.76 |
| Wheat | bu. | 9.32 | 11.78 | 7.55 | 3.90 | 2.45 | 2.99 |
| Oats | bu. | 5.61 | 3.17 | 6.00 | 5.11 | 1.48 | 3.73 |
| Cotton | lb. | 493.43 | 201.87 | 265.22 | 290.54 | 228.64 | 92.93 |
| Hay | tons | .42 | .54 | .39 | .66 | .26 | .26 |
| Peas & beans | bu. | - | .63 | .19 | .38 | .26 | .25 |
| Sweet potatoes | bu. | 1.86 | 2.09 | .62 | 2.31 | .89 | .71 |
| Peach orchards | trees | - | - | 1.40 | 2.70 | .91 | .30 |

1. Per capita of the population residing outside of cities, towns and villages reported in the census.

LIVESTOCK, LIVESTOCK PRODUCTS AND CROPS

Per Capita¹ Holdings and ProductionSpartanburg Co., S. C.

| | | <u>1839</u> | <u>1859</u> | <u>1889</u> | <u>1909</u> | <u>1929</u> | <u>1939</u> |
|-------------------|-------|-------------|-------------|-------------|-------------|-------------|-------------|
| Livestock: | | | | | | | |
| Milk cows | | - | .23 | .12 | .16 | .13 | .11 |
| Sheep | | .46 | .58 | .05 | .00 | .00 | .00 |
| Swine | | 1.32 | 2.19 | .23 | .17 | .11 | .11 |
| Milk sold | gal. | - | - | - | 1.39 | 8.04 | 9.07 |
| Butter made | lb. | - | 8.41 | 10.66 | 20.40 | 17.73 | 13.84 |
| Crops: | | | | | | | |
| Corn | bu. | 30.53 | 29.75 | 15.19 | 14.57 | 12.48 | 9.60 |
| Wheat | bu. | 2.47 | 5.26 | 2.39 | .96 | .67 | 2.26 |
| Oats | bu. | 2.85 | 1.78 | 2.67 | 1.97 | .54 | 2.39 |
| Cotton | lb. | 67.40 | 104.96 | 365.58 | 383.03 | 519.08 | 284.78 |
| Hay | tons | .00 | .02 | .00 | .11 | .02 | .11 |
| Peas & beans | bu. | - | 1.56 | .13 | .13 | .06 | .18 |
| Sweet potatoes | bu. | .10 | 3.71 | 1.61 | 1.67 | 1.02 | 1.38 |
| Peach orchards | trees | - | - | .41 | 1.20 | 1.99 | 10.59 |

1. Per capita of the population residing outside of cities, towns and villages reported in the census.

| Year | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 11. | 21. | 31. | 41. | 51. | 61. | 71. | 81. | 91. | 101. | 111. | 121. | 131. | 141. | 151. | 161. | 171. | 181. | 191. | 201. | 211. | 221. | 231. | 241. | 251. | 261. | 271. | 281. | 291. | 301. | 311. | 321. | 331. | 341. | 351. | 361. | 371. | 381. | 391. | 401. | 411. | 421. | 431. | 441. | 451. | 461. | 471. | 481. | 491. | 501. | 511. | 521. | 531. | 541. | 551. | 561. | 571. | 581. | 591. | 601. | 611. | 621. | 631. | 641. | 651. | 661. | 671. | 681. | 691. | 701. | 711. | 721. | 731. | 741. | 751. | 761. | 771. | 781. | 791. | 801. | 811. | 821. | 831. | 841. | 851. | 861. | 871. | 881. | 891. | 901. | 911. | 921. | 931. | 941. | 951. | 961. | 971. | 981. | 991. | 1001. | 1011. | 1021. | 1031. | 1041. | 1051. | 1061. | 1071. | 1081. | 1091. | 1101. | 1111. | 1121. | 1131. | 1141. | 1151. | 1161. | 1171. | 1181. | 1191. | 1201. | 1211. | 1221. | 1231. | 1241. | 1251. | 1261. | 1271. | 1281. | 1291. | 1301. | 1311. | 1321. | 1331. | 1341. | 1351. | 1361. | 1371. | 1381. | 1391. | 1401. | 1411. | 1421. | 1431. | 1441. | 1451. | 1461. | 1471. | 1481. | 1491. | 1501. | 1511. | 1521. | 1531. | 1541. | 1551. | 1561. | 1571. | 1581. | 1591. | 1601. | 1611. | 1621. | 1631. | 1641. | 1651. | 1661. | 1671. | 1681. | 1691. | 1701. | 1711. | 1721. | 1731. | 1741. | 1751. | 1761. | 1771. | 1781. | 1791. | 1801. | 1811. | 1821. | 1831. | 1841. | 1851. | 1861. | 1871. | 1881. | 1891. | 1901. | 1911. | 1921. | 1931. | 1941. | 1951. | 1961. | 1971. | 1981. | 1991. | 2001. | 2011. | 2021. | 2031. | 2041. | 2051. | 2061. | 2071. | 2081. | 2091. | 2101. | 2111. | 2121. | 2131. | 2141. | 2151. | 2161. | 2171. | 2181. | 2191. | 2201. | 2211. | 2221. | 2231. | 2241. | 2251. | 2261. | 2271. | 2281. | 2291. | 2301. | 2311. | 2321. | 2331. | 2341. | 2351. | 2361. | 2371. | 2381. | 2391. | 2401. | 2411. | 2421. | 2431. | 2441. | 2451. | 2461. | 2471. | 2481. | 2491. | 2501. | 2511. | 2521. | 2531. | 2541. | 2551. | 2561. | 2571. | 2581. | 2591. | 2601. | 2611. | 2621. | 2631. | 2641. | 2651. | 2661. |

1. For copies of the physician's report, please contact the physician's office.

LIVESTOCK, LIVESTOCK PRODUCTS AND CROPS

Per Capita¹ Holdings and ProductionFairfield Co., S.C.

| | | <u>1839</u> | <u>1859</u> | <u>1889</u> | <u>1909</u> | <u>1929</u> | <u>1939</u> |
|-------------------|-------|-------------|-------------|-------------|-------------|-------------|-------------|
| Livestock: | | | | | | | |
| Milk cows | | - | .20 | .10 | .19 | .16 | .13 |
| Sheep | | .34 | .30 | .05 | .01 | .04 | .00 |
| Swine | | 1.21 | 1.07 | .33 | .36 | .27 | .25 |
| Milk sold | gal. | - | - | - | .10 | 1.45 | 2.15 |
| Butter made | lb. | - | 7.87 | 8.10 | 11.21 | 10.27 | 7.56 |
| Crops: | | | | | | | |
| Corn | bu. | 27.57 | 24.00 | 11.97 | 12.05 | 11.68 | 10.97 |
| Wheat | bu. | 1.12 | 2.18 | .17 | .04 | .48 | .92 |
| Oats | bu. | 2.83 | 1.97 | 2.79 | 3.11 | 1.63 | 2.79 |
| Cotton | lb. | 404.63 | 408.92 | 415.37 | 467.87 | 207.34 | 254.56 |
| Hay | tons | - | .20 | .04 | .14 | .16 | .19 |
| Peas & beans | bu. | - | 2.84 | .66 | .78 | .39 | .98 |
| Sweet potatoes | bu. | 1.02 | 3.78 | 2.47 | 2.78 | 2.99 | 2.16 |
| Peach orchards | trees | - | - | .67 | .84 | .71 | .73 |

1. Per capita of the population residing outside of cities, towns and villages reported in the census.

| Year | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 |
|------|------|------|------|------|------|------|------|
| 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 |
| 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 |
| 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
| 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
| 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
| 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 |
| 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 |
| 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 |
| 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 |
| 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 |
| 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 |
| 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 |
| 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 |
| 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 |
| 2097 | 2098 | 2099 | 2100 | 2101 | 2102 | 2103 | 2104 |
| 2105 | 2106 | 2107 | 2108 | 2109 | 2110 | 2111 | 2112 |
| 2113 | 2114 | 2115 | 2116 | 2117 | 2118 | 2119 | 2120 |
| 2121 | 2122 | 2123 | 2124 | 2125 | 2126 | 2127 | 2128 |
| 2129 | 2130 | 2131 | 2132 | 2133 | 2134 | 2135 | 2136 |
| 2137 | 2138 | 2139 | 2140 | 2141 | 2142 | 2143 | 2144 |
| 2145 | 2146 | 2147 | 2148 | 2149 | 2150 | 2151 | 2152 |
| 2153 | 2154 | 2155 | 2156 | 2157 | 2158 | 2159 | 2160 |
| 2161 | 2162 | 2163 | 2164 | 2165 | 2166 | 2167 | 2168 |
| 2169 | 2170 | 2171 | 2172 | 2173 | 2174 | 2175 | 2176 |
| 2177 | 2178 | 2179 | 2180 | 2181 | 2182 | 2183 | 2184 |
| 2185 | 2186 | 2187 | 2188 | 2189 | 2190 | 2191 | 2192 |
| 2193 | 2194 | 2195 | 2196 | 2197 | 2198 | 2199 | 2200 |
| 2201 | 2202 | 2203 | 2204 | 2205 | 2206 | 2207 | 2208 |
| 2209 | 2210 | 2211 | 2212 | 2213 | 2214 | 2215 | 2216 |
| 2217 | 2218 | 2219 | 2220 | 2221 | 2222 | 2223 | 2224 |
| 2225 | 2226 | 2227 | 2228 | 2229 | 2230 | 2231 | 2232 |
| 2233 | 2234 | 2235 | 2236 | 2237 | 2238 | 2239 | 2240 |
| 2241 | 2242 | 2243 | 2244 | 2245 | 2246 | 2247 | 2248 |
| 2249 | 2250 | 2251 | 2252 | 2253 | 2254 | 2255 | 2256 |
| 2257 | 2258 | 2259 | 2260 | 2261 | 2262 | 2263 | 2264 |
| 2265 | 2266 | 2267 | 2268 | 2269 | 2270 | 2271 | 2272 |
| 2273 | 2274 | 2275 | 2276 | 2277 | 2278 | 2279 | 2280 |
| 2281 | 2282 | 2283 | 2284 | 2285 | 2286 | 2287 | 2288 |
| 2289 | 2290 | 2291 | 2292 | 2293 | 2294 | 2295 | 2296 |
| 2297 | 2298 | 2299 | 2300 | 2301 | 2302 | 2303 | 2304 |
| 2305 | 2306 | 2307 | 2308 | 2309 | 2310 | 2311 | 2312 |
| 2313 | 2314 | 2315 | 2316 | 2317 | 2318 | 2319 | 2320 |
| 2321 | 2322 | 2323 | 2324 | 2325 | 2326 | 2327 | 2328 |

1. The results of the present study provide evidence that the relationship between the two variables is not linear.

LIVESTOCK, LIVESTOCK PRODUCTS AND CROPS

Per Capita¹ Holdings and ProductionHall Co., Ga.

| | <u>1839</u> | <u>1859</u> | <u>1889</u> | <u>1909</u> | <u>1929</u> | <u>1939</u> |
|--|-------------|-------------|-------------|-------------|-------------|-------------|
|--|-------------|-------------|-------------|-------------|-------------|-------------|

Livestock:

| | | | | | | | |
|-------------|------|------|------|-------|-------|-------|-------|
| Milk cows | | - | .19 | .16 | .19 | .17 | .15 |
| Sheep | | .53 | .64 | .17 | .01 | .00 | .00 |
| Swine | | 1.52 | 1.40 | .60 | .25 | .12 | .13 |
| Milk sold | gal. | - | - | - | .87 | 4.23 | 12.19 |
| Butter made | lb. | - | 6.88 | 17.19 | 26.96 | 25.03 | 17.44 |

Crops:

| | | | | | | | |
|----------------|-------|-------|-------|--------|--------|--------|--------|
| Corn | bu. | 28.49 | 36.64 | 23.02 | 19.61 | 13.86 | 12.05 |
| Wheat | bu. | 3.11 | 3.89 | 2.06 | 1.39 | .43 | .82 |
| Oats | bu. | 5.00 | 1.15 | 2.69 | 1.12 | .25 | 1.32 |
| Cotton | lb. | 61.24 | 24.09 | 211.13 | 362.09 | 355.06 | 199.79 |
| Hay | tons | .00 | .00 | .04 | .06 | .02 | .09 |
| Peas & beans | bu. | - | .66 | .24 | .07 | .19 | .52 |
| Sweet potatoes | bu. | 1.13 | 4.09 | 2.86 | 2.13 | 1.36 | 2.11 |
| Peach orchards | trees | - | - | 2.69 | 5.01 | 1.54 | 1.11 |

1. Per capita of the population residing outside of cities, towns and villages reported in the census.

LIVESTOCK, LIVESTOCK PRODUCTS AND CROPS

Per Capita¹ Holdings and ProductionGreene Co., Ga.1839 1859 1889 1909 1929 1939

Livestock:

| | | | | | | | |
|-------------|------|------|------|-------|-------|-------|-------|
| Milk cows | | - | .19 | .15 | .27 | .42 | .32 |
| Sheep | | .60 | .47 | .05 | .01 | .00 | .01 |
| Swine | | 2.40 | 1.78 | .61 | .43 | .41 | .43 |
| Milk sold | gal. | - | - | - | 11.08 | 31.29 | 17.29 |
| Butter made | lb. | - | 5.45 | 12.81 | 16.19 | 20.45 | 22.77 |

Crops:

| | | | | | | | |
|----------------|-------|--------|--------|--------|--------|--------|--------|
| Corn | bu. | 34.23 | 24.04 | 17.88 | 15.73 | 20.70 | 19.39 |
| Wheat | bu. | 5.01 | 2.76 | .59 | .35 | .47 | 2.94 |
| Oats | bu. | 3.03 | 1.93 | 2.66 | 1.96 | .79 | 1.76 |
| Cotton | lb. | 235.79 | 307.40 | 577.06 | 655.54 | 487.74 | 297.50 |
| Hay | tons | - | .31 | .10 | .26 | .15 | .39 |
| Peas & beans | bu. | - | 1.55 | .94 | .48 | .79 | 1.68 |
| Sweet potatoes | bu. | 1.08 | 4.82 | 5.04 | 3.21 | 3.68 | 7.33 |
| Peach orchards | trees | - | - | .17 | 7.60 | .70 | 1.26 |

1. Per capita of the population residing outside of cities, towns and villages reported in the census.

LIVESTOCK, LIVESTOCK PRODUCTS AND CROPS

Per Capita¹ Holdings and ProductionCampbell, Cobb, DeKalb, Douglas,
Fulton, Milton Counties, Ga.

| | | <u>1839</u> | <u>1859</u> | <u>1889</u> | <u>1909</u> | <u>1929</u> | <u>1939</u> |
|-------------------|-------|-------------|-------------|-------------|-------------|-------------|-------------|
| Livestock: | | | | | | | |
| Milk cows | | - | .22 | .16 | .24 | .16 | .11 |
| Sheep | | .47 | .43 | .03 | .00 | .00 | .00 |
| Swine | | 2.36 | 1.71 | .42 | .21 | .12 | .10 |
| Milk sold | gal. | - | - | - | 17.58 | 28.96 | 29.24 |
| Butter made | lb. | - | 8.15 | 18.42 | 28.19 | 20.00 | 11.83 |
| Crops: | | | | | | | |
| Corn | bu. | 36.12 | 32.12 | 18.25 | 14.93 | 8.23 | 4.38 |
| Wheat | bu. | 4.71 | 5.53 | 8.40 | .87 | .08 | .28 |
| Oats | bu. | 3.24 | 1.76 | 3.52 | 2.09 | .14 | .43 |
| Cotton | lb. | 67.31 | 146.89 | 267.01 | 353.71 | 194.70 | 63.78 |
| Hay | tons | .00 | .01 | .11 | .17 | .06 | .09 |
| Peas & beans | bu. | - | .57 | .20 | .17 | .15 | .16 |
| Sweet potatoes | bu. | .43 | 5.19 | 3.91 | 4.82 | 2.61 | 1.59 |
| Peach orchards | trees | - | - | 3.13 | 5.74 | .79 | .43 |

1. Per capita of the population residing outside of cities, towns and villages reported in the census.

| Year | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 | 1908 | 1909 | 1910 | 1911 | 1912 | 1913 | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 | 1908 | 1909 | 1910 | 1911 | 1912 | 1913 | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 | |

1. The copies of the report are being furnished to the Bureau and the Census Bureau for their use.

LIVESTOCK, LIVESTOCK PRODUCTS AND CROPS

Per Capita¹ Holdings and ProductionHarris Co., Ga.

| | <u>1839</u> | <u>1859</u> | <u>1889</u> | <u>1909</u> | <u>1929</u> | <u>1939</u> |
|--|-------------|-------------|-------------|-------------|-------------|-------------|
|--|-------------|-------------|-------------|-------------|-------------|-------------|

Livestock:

| | | | | | | | |
|-------------|------|-----|------|-------|-------|-------|-------|
| Milk cows | | - | .27 | .16 | .20 | .27 | .28 |
| Sheep | | .08 | .25 | .02 | .00 | .01 | .00 |
| Swine | | .56 | 1.93 | .50 | .44 | .43 | .43 |
| Milk sold | gal. | - | - | - | .13 | 18.56 | 31.10 |
| Butter made | lb. | - | 6.75 | 11.94 | 15.81 | 15.65 | 17.86 |

Crops:

| | | | | | | | |
|----------------|-------|-------|--------|--------|--------|--------|--------|
| Corn | bu. | 9.49 | 36.25 | 16.47 | 15.65 | 19.99 | 15.73 |
| Wheat | bu. | .90 | 2.29 | .15 | .11 | .00 | .13 |
| Oats | bu. | .22 | .44 | 2.15 | 4.32 | .10 | 1.62 |
| Cotton | lb. | 51.62 | 488.32 | 529.26 | 587.92 | 237.50 | 141.57 |
| Hay | tons | - | .19 | .03 | .04 | .03 | .21 |
| Peas & beans | bu. | - | .44 | .39 | .40 | 1.26 | 1.79 |
| Sweet potatoes | bu. | .13 | 6.15 | 3.24 | 2.92 | 7.80 | 10.09 |
| Peach orchards | trees | - | - | 2.78 | 2.12 | 3.31 | .95 |

1. Per capita of the population residing outside of cities, towns and villages reported in the census.

TABLE 1. SUMMARY OF DATA FOR THE STUDY

For the purpose of this study, the following data were collected:

1. The number of subjects in each group.

| Group | Age | Gender | Height | Weight | Time | Score |
|-------|-----|--------|--------|--------|------|-------|
| 1 | 20 | M | 170 | 65 | 10 | 100 |
| 2 | 21 | F | 165 | 55 | 15 | 110 |
| 3 | 22 | M | 175 | 70 | 20 | 120 |
| 4 | 23 | F | 160 | 50 | 25 | 130 |
| 5 | 24 | M | 170 | 60 | 30 | 140 |
| 6 | 25 | F | 165 | 55 | 35 | 150 |
| 7 | 26 | M | 175 | 70 | 40 | 160 |
| 8 | 27 | F | 160 | 50 | 45 | 170 |
| 9 | 28 | M | 170 | 60 | 50 | 180 |
| 10 | 29 | F | 165 | 55 | 55 | 190 |
| 11 | 30 | M | 175 | 70 | 60 | 200 |
| 12 | 31 | F | 160 | 50 | 65 | 210 |
| 13 | 32 | M | 170 | 60 | 70 | 220 |
| 14 | 33 | F | 165 | 55 | 75 | 230 |
| 15 | 34 | M | 175 | 70 | 80 | 240 |
| 16 | 35 | F | 160 | 50 | 85 | 250 |
| 17 | 36 | M | 170 | 60 | 90 | 260 |
| 18 | 37 | F | 165 | 55 | 95 | 270 |
| 19 | 38 | M | 175 | 70 | 100 | 280 |
| 20 | 39 | F | 160 | 50 | 105 | 290 |
| 21 | 40 | M | 170 | 60 | 110 | 300 |
| 22 | 41 | F | 165 | 55 | 115 | 310 |
| 23 | 42 | M | 175 | 70 | 120 | 320 |
| 24 | 43 | F | 160 | 50 | 125 | 330 |
| 25 | 44 | M | 170 | 60 | 130 | 340 |
| 26 | 45 | F | 165 | 55 | 135 | 350 |
| 27 | 46 | M | 175 | 70 | 140 | 360 |
| 28 | 47 | F | 160 | 50 | 145 | 370 |
| 29 | 48 | M | 170 | 60 | 150 | 380 |
| 30 | 49 | F | 165 | 55 | 155 | 390 |
| 31 | 50 | M | 175 | 70 | 160 | 400 |
| 32 | 51 | F | 160 | 50 | 165 | 410 |
| 33 | 52 | M | 170 | 60 | 170 | 420 |
| 34 | 53 | F | 165 | 55 | 175 | 430 |
| 35 | 54 | M | 175 | 70 | 180 | 440 |
| 36 | 55 | F | 160 | 50 | 185 | 450 |
| 37 | 56 | M | 170 | 60 | 190 | 460 |
| 38 | 57 | F | 165 | 55 | 195 | 470 |
| 39 | 58 | M | 175 | 70 | 200 | 480 |
| 40 | 59 | F | 160 | 50 | 205 | 490 |
| 41 | 60 | M | 170 | 60 | 210 | 500 |
| 42 | 61 | F | 165 | 55 | 215 | 510 |
| 43 | 62 | M | 175 | 70 | 220 | 520 |
| 44 | 63 | F | 160 | 50 | 225 | 530 |
| 45 | 64 | M | 170 | 60 | 230 | 540 |
| 46 | 65 | F | 165 | 55 | 235 | 550 |
| 47 | 66 | M | 175 | 70 | 240 | 560 |
| 48 | 67 | F | 160 | 50 | 245 | 570 |
| 49 | 68 | M | 170 | 60 | 250 | 580 |
| 50 | 69 | F | 165 | 55 | 255 | 590 |
| 51 | 70 | M | 175 | 70 | 260 | 600 |
| 52 | 71 | F | 160 | 50 | 265 | 610 |
| 53 | 72 | M | 170 | 60 | 270 | 620 |
| 54 | 73 | F | 165 | 55 | 275 | 630 |
| 55 | 74 | M | 175 | 70 | 280 | 640 |
| 56 | 75 | F | 160 | 50 | 285 | 650 |
| 57 | 76 | M | 170 | 60 | 290 | 660 |
| 58 | 77 | F | 165 | 55 | 295 | 670 |
| 59 | 78 | M | 175 | 70 | 300 | 680 |
| 60 | 79 | F | 160 | 50 | 305 | 690 |
| 61 | 80 | M | 170 | 60 | 310 | 700 |
| 62 | 81 | F | 165 | 55 | 315 | 710 |
| 63 | 82 | M | 175 | 70 | 320 | 720 |
| 64 | 83 | F | 160 | 50 | 325 | 730 |
| 65 | 84 | M | 170 | 60 | 330 | 740 |
| 66 | 85 | F | 165 | 55 | 335 | 750 |
| 67 | 86 | M | 175 | 70 | 340 | 760 |
| 68 | 87 | F | 160 | 50 | 345 | 770 |
| 69 | 88 | M | 170 | 60 | 350 | 780 |
| 70 | 89 | F | 165 | 55 | 355 | 790 |
| 71 | 90 | M | 175 | 70 | 360 | 800 |
| 72 | 91 | F | 160 | 50 | 365 | 810 |
| 73 | 92 | M | 170 | 60 | 370 | 820 |
| 74 | 93 | F | 165 | 55 | 375 | 830 |
| 75 | 94 | M | 175 | 70 | 380 | 840 |
| 76 | 95 | F | 160 | 50 | 385 | 850 |
| 77 | 96 | M | 170 | 60 | 390 | 860 |
| 78 | 97 | F | 165 | 55 | 395 | 870 |
| 79 | 98 | M | 175 | 70 | 400 | 880 |
| 80 | 99 | F | 160 | 50 | 405 | 890 |
| 81 | 100 | M | 170 | 60 | 410 | 900 |
| 82 | 101 | F | 165 | 55 | 415 | 910 |
| 83 | 102 | M | 175 | 70 | 420 | 920 |
| 84 | 103 | F | 160 | 50 | 425 | 930 |
| 85 | 104 | M | 170 | 60 | 430 | 940 |
| 86 | 105 | F | 165 | 55 | 435 | 950 |
| 87 | 106 | M | 175 | 70 | 440 | 960 |
| 88 | 107 | F | 160 | 50 | 445 | 970 |
| 89 | 108 | M | 170 | 60 | 450 | 980 |
| 90 | 109 | F | 165 | 55 | 455 | 990 |
| 91 | 110 | M | 175 | 70 | 460 | 1000 |

The data were collected from the following sources: 1. The number of subjects in each group. 2. The age of each subject. 3. The gender of each subject. 4. The height of each subject. 5. The weight of each subject. 6. The time taken for each subject to complete the task. 7. The score achieved by each subject.

Appendix V**AGRICULTURAL DATA BY SIZE OF FARM, 1860**

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Table No. 1

AGRICULTURAL DATA BY SIZE OF FARM, 1860
Caswell Co., N.C.

| | 0-100
acres | 101-200
acres | 201-500
acres | 501-1000
acres | 1001-
& over | Acreage
not
given |
|------------------|----------------|------------------|------------------|-------------------|-----------------|-------------------------|
| No. of farms | 88 | 181 | 267 | 130 | 31 | 93 |
| Percent of farms | 11.1 | 22.9 | 33.8 | 16.5 | 3 | 11.8 |
| Total land | 6,195 | 28,260 | 87,269 | 90,160 | 43,554 | - |
| Improved land | 4,308 | 19,332 | 58,200 | 56,395 | 26,715 | - |
| Cash value | 117,313 | 329,209 | 1,307,757 | 1,303,361 | 730,053 | - |
| Horses and mules | 361 | 1,998 | 2,157 | 2,529 | 814 | 396 |
| Cattle | 418 | 1,119 | 2,832 | 2,371 | 979 | 331 |
| Swine | 803 | 2,390 | 6,256 | 5,017 | 2,033 | 841 |
| Wheat | 4,035 | 12,799 | 39,110 | 35,158 | 14,160 | 3,608 |
| Corn | 16,385 | 43,865 | 142,296 | 130,005 | 54,365 | 16,613 |
| Oats | 4,588 | 13,408 | 39,084 | 36,594 | 13,932 | 8,958 |
| Tobacco | 178,290 | 600,724 | 1,587,752 | 1,499,006 | 609,500 | 204,686 |
| Cotton | 1 | - | 10 | 13 | 10 | 2 |
| Hay | 12 | 30 | 152 | 138 | 48 | 1 |
| Peas & beans | 631 | 934 | 3,087 | 2,692 | 704 | 295 |
| Sweet potatoes | 2,777 | 5,339 | 12,070 | 10,001 | 4,741 | 1,899 |

Source: Eighth Census, 1860, Agriculture, Caswell Co, N.C., N.C.
MS returns. North Carolina State Library, Raleigh, N.C.

Table No. 2

AGRICULTURAL DATA BY SIZE OF FARM, 1860
Davidson Co., N. C.

| | 0-100
acres | 101-200
acres | 201-500
acres | 501-1000
acres | 1001-
& over | Acreage
not
given |
|------------------|----------------|------------------|------------------|-------------------|-----------------|-------------------------|
| No. of farms | 495 | 586 | 432 | 80 | 13 | 1 |
| Percent of farms | 30.8 | 36.5 | 26.2 | 5.0 | 8 | .1 |
| Total land | 35,365 | 87,053 | 130,030 | 53,348 | 20,214 | - |
| Improved land | 17,910 | 36,360 | 44,597 | 15,583 | 9,742 | - |
| Cash value | 215,579 | 482,470 | 712,947 | 336,352 | 277,010 | - |
| Horses and mules | 728 | 1,316 | 1,431 | 472 | 211 | 2 |
| Cattle | 1,529 | 2,770 | 3,150 | 987 | 541 | 7 |
| Swine | 5,349 | 8,830 | 9,747 | 2,862 | 1,169 | 4 |
| Wheat | 37,244 | 68,174 | 77,230 | 25,006 | 17,775 | 96 |
| Corn | 80,259 | 138,802 | 147,512 | 60,150 | 30,300 | 100 |
| Oats | 12,300 | 26,216 | 33,322 | 12,601 | 12,300 | 15 |
| Tobacco | 8,787 | 31,785 | 25,415 | 50,668 | 8,000 | 6 |
| Cotton | 2 | 33 | 99 | 114 | 207 | - |
| Hay | 1,030 | 2,162 | 3,159 | 724 | 423 | 3 |

Source: Eighth Census, 1860, Agriculture, Davidson Co., N.C.,
MS returns. North Carolina State Library, Raleigh, N.C.

Table No. 3

AGRICULTURAL DATA BY SIZE OF FARM, 1860
Fairfield District, S. C.

| | 0-100
acres | 101-200
acres | 201-500
acres | 501-1000
acres | 1001-
& over
acres |
|------------------|----------------|------------------|------------------|-------------------|--------------------------|
| No. of farms | 46 | 122 | 235 | 158 | 123 |
| Percent of farms | 6.7 | 17.8 | 34.4 | 23.1 | 18.0 |
| Total land | 3,498 | 18,924 | 80,800 | 115,326 | 303,125 |
| Improved land | 2,285 | 11,063 | 43,734 | 57,287 | 118,856 |
| Cash value | 47,769 | 225,114 | 973,834 | 1,319,971 | 3,500,951 |
| Horses and mules | 92 | 360 | 1,113 | 1,238 | 2,256 |
| Cattle | 266 | 729 | 2,571 | 2,797 | 5,128 |
| Swine | 652 | 1,930 | 5,570 | 6,358 | 8,292 |
| Wheat | 734 | 3,222 | 12,095 | 12,976 | 18,285 |
| Corn | 8,705 | 34,525 | 104,580 | 131,105 | 226,400 |
| Oats | 448 | 2,718 | 6,187 | 11,987 | 20,731 |
| Cotton | 206 | 1,003 | 3,304 | 5,192 | 10,782 |
| Hay | 90 | 337 | 909 | 3,118 | 1,640 |
| Peas & beans | 1,337 | 5,315 | 14,273 | 15,897 | 22,215 |
| Sweet potatoes | 2,969 | 8,983 | 16,182 | 21,544 | 22,753 |

Source: Eighth Census, 1860, Agriculture, Fairfield District, S. C.,
MS returns. South Carolina State Library, Columbia, S. C.

Table No. 4

AGRICULTURAL DATA BY SIZE OF FARM, 1860
Spartanburg District, S.C., Northern Division

| | 0-100
acres | 101-200
acres | 201-500
acres | 501-1000
acres | 1001-
& over
acres |
|------------------|----------------|------------------|------------------|-------------------|--------------------------|
| No. of farms | 344 | 236 | 216 | 102 | 22 |
| Percent of farms | 37.4 | 25.6 | 23.5 | 11.1 | 2.4 |
| Total land | 8,502 | 35,639 | 70,097 | 74,060 | 47,378 |
| Improved land | 3,020 | 10,184 | 17,913 | 16,110 | 5,950 |
| Cash value | 57,482 | 234,290 | 485,465 | 656,982 | 266,200 |
| Horses and mules | 460 | 449 | 749 | 579 | 232 |
| Cattle | 1,469 | 1,468 | 2,424 | 1,677 | 485 |
| Swine | 3,167 | 3,108 | 4,334 | 3,193 | 972 |
| Wheat | 10,182 | 9,571 | 16,689 | 13,736 | 7,445 |
| Corn | 72,935 | 54,355 | 95,530 | 85,765 | 25,600 |
| Oats | 2,725 | 3,023 | 3,613 | 5,741 | 2,554 |
| Cotton | 156 | 114 | 236 | 175 | 134 |
| Hay | 30 | 9 | 43 | 53 | 206 |
| Peas & beans | 2,642 | 2,911 | 4,394 | 2,524 | 1,300 |
| Sweet potatoes | 10,490 | 8,694 | 10,597 | 7,956 | 2,970 |

Source: Eighth Census, 1860, Agriculture, Spartanburg District, S.C.,
 MS returns. South Carolina State Library, Columbia, S. C.

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APPENDIX A

1. Introduction

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1. Name of the person or organization: [illegible]

2. Address: [illegible]

3. Date of birth: [illegible]

4. Place of birth: [illegible]

5. Education: [illegible]

6. Occupation: [illegible]

7. Marital status: [illegible]

8. Date of marriage: [illegible]

9. Name of spouse: [illegible]

10. Name of children: [illegible]

11. Date of last contact: [illegible]

12. Date of last sighting: [illegible]

13. Date of last communication: [illegible]

14. Date of last contact: [illegible]

15. Date of last sighting: [illegible]

16. Date of last communication: [illegible]

17. Date of last contact: [illegible]

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NOTES: [illegible]

REMARKS: [illegible]

DATE: [illegible]

BY: [illegible]

FOR: [illegible]

REASON: [illegible]

REMARKS: [illegible]

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1. The first part of the paper is devoted to a general survey of the literature on the subject of the influence of the environment on the development of the individual.

2. The second part of the paper is devoted to a detailed study of the influence of the environment on the development of the individual, with special reference to the influence of the social environment.

3. The third part of the paper is devoted to a study of the influence of the environment on the development of the individual, with special reference to the influence of the physical environment.

4. The fourth part of the paper is devoted to a study of the influence of the environment on the development of the individual, with special reference to the influence of the cultural environment.

5. The fifth part of the paper is devoted to a study of the influence of the environment on the development of the individual, with special reference to the influence of the economic environment.

6. The sixth part of the paper is devoted to a study of the influence of the environment on the development of the individual, with special reference to the influence of the political environment.

7. The seventh part of the paper is devoted to a study of the influence of the environment on the development of the individual, with special reference to the influence of the religious environment.

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1. General - The purpose of this document is to provide information regarding the various aspects of the project.

2. Objectives - The primary objectives of the project are to develop a comprehensive understanding of the subject matter and to identify the key factors influencing the outcome.

3. Methodology - The methodology employed in this study involves a combination of qualitative and quantitative research methods.

4. Results - The results of the study indicate that there is a significant correlation between the variables under investigation.

5. Conclusion - Based on the findings, it is concluded that the project has successfully achieved its intended goals.

6. Recommendations - It is recommended that further research be conducted to explore the underlying causes of the observed phenomena.

7. References - The following references are cited in this document to support the findings and conclusions.

8. Appendix - The appendix contains supplementary information, including data tables and additional figures.

9. Notes - The following notes provide additional context and details regarding the study.

10. Summary - A brief summary of the entire document is provided for quick reference.

11. Index - An index is included to facilitate the location of specific information within the document.

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1. General - The purpose of this report is to provide a summary of the work done during the past year.

2. Objectives - The main objectives of the project were to investigate the effects of the treatment on the growth of the plants.

3. Materials and Methods - The materials used were of the highest quality and the methods employed were standard.

4. Results - The results of the experiment showed that the treatment had a significant effect on the growth of the plants.

5. Conclusions - It is concluded that the treatment is effective in promoting the growth of the plants.

6. References - The following references are given in the text of the report.

7. Appendix - The following tables and figures are included in the appendix.

8. Summary - A brief summary of the work done during the past year is given in this section.

9. Conclusions - The main conclusions of the project are given in this section.

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18. References - The following references are given in the text of the report.

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16. The sixteenth part of the report is devoted to a detailed analysis of the environment situation.

17. The seventeenth part of the report is devoted to a detailed analysis of the energy situation.

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COMMITTED BY THE KKK IN THE SOUTH

REPORT OF THE COMMISSIONER OF INVESTIGATION

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AND THE SENATE

IN RESPONSE TO RESOLUTIONS
PASSED BY THE HOUSE OF REPRESENTATIVES
ON MARCH 12, 1944

AND BY THE SENATE
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BIOGRAPHICAL NOTE

The author, the son of Arthur Burnside Hall and Mary Ryker Hall, was born in Springfield, Missouri on September 26, 1908. He graduated from high school at Miami, Oklahoma in 1927, and from Northeastern Oklahoma Junior College in the same town in 1929. He attended the University of Oklahoma, receiving the B.A. degree in 1931 and the M.A. in history in 1933. While at the University of Oklahoma he served as graduate assistant in the department of geography. He taught history in high school, Broken Bow, Oklahoma in 1935. Graduate work for the Ph.D. degree in history was done by him at Duke University in the academic years 1934-1935 and 1940-1941.

He was employed in the Soil Conservation Service, United States Department of Agriculture from 1935 to 1942. During this time he made historical studies of the soil erosion problem in the Southeast. From 1942 to 1947 he worked in the Department of State, Division of Geography and Cartography, Washington, D. C., and at present is employed in the Central Intelligence Agency, Washington. He wrote, in addition to the two Department of Agriculture bulletins cited in the bibliography, an article, "The Red Stick War," Chronicles of Oklahoma, v. 12 (Sept. 1934), a chapter on international boundary problems in a forthcoming book, World Political Geography, edited by G. Etzel Percy and Russell H. Fifield, and reports for government use.

PERSONAL DATA

1. Name: [Name obscured]

2. Date of Birth: [Date obscured]

3. Place of Birth: [Place obscured]

4. Education: [Education obscured]

5. Occupation: [Occupation obscured]

6. Military Service: [Military Service obscured]

7. Awards and Honors: [Awards and Honors obscured]

8. Family: [Family obscured]

9. Other Information: [Other Information obscured]

10. Remarks: [Remarks obscured]

11. Signature: [Signature obscured]

12. Date: [Date obscured]

13. Place: [Place obscured]

14. Remarks: [Remarks obscured]

15. Other Information: [Other Information obscured]

16. Signature: [Signature obscured]

17. Date: [Date obscured]

18. Place: [Place obscured]

19. Remarks: [Remarks obscured]

20. Other Information: [Other Information obscured]

21. Signature: [Signature obscured]

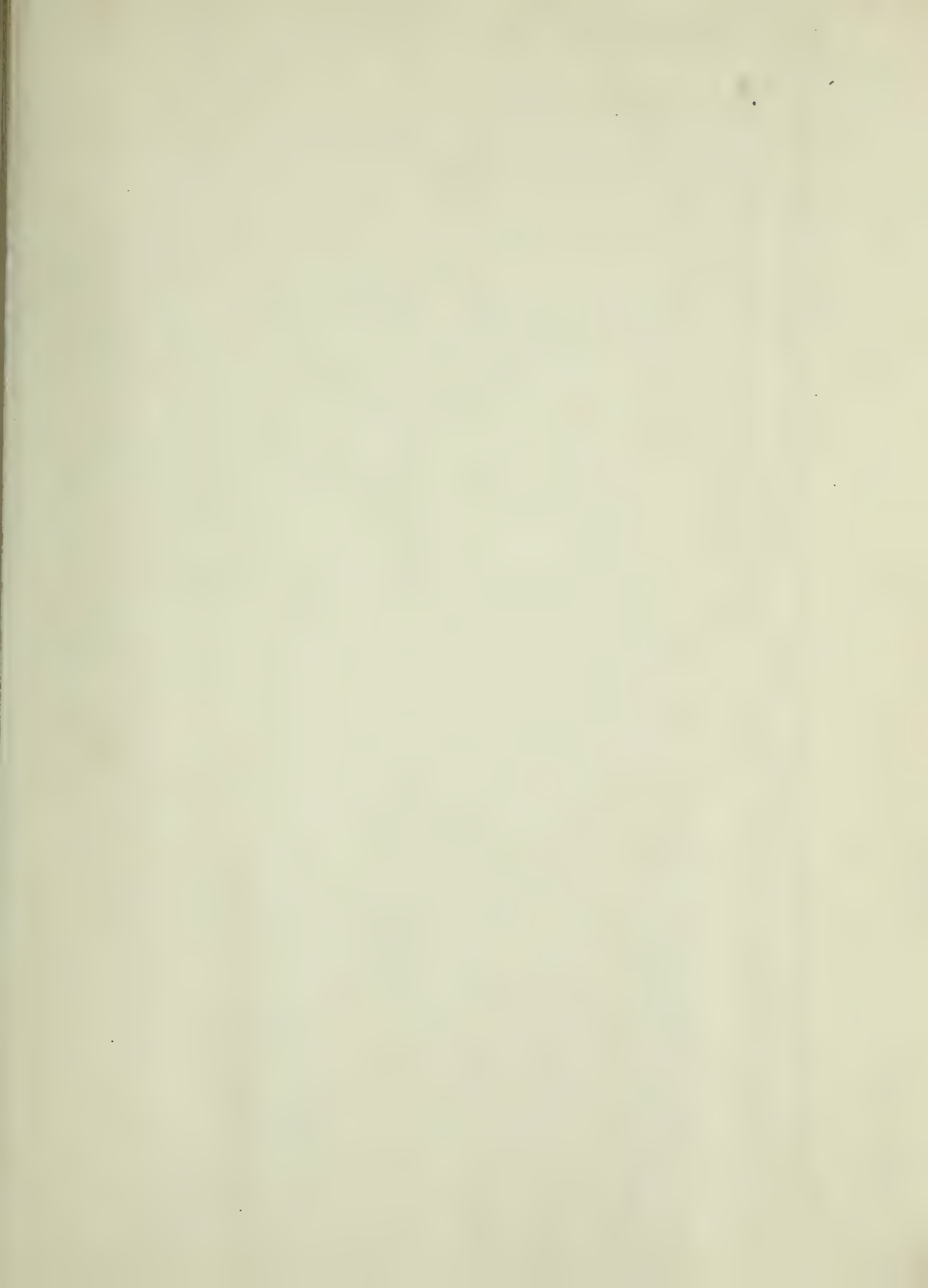
22. Date: [Date obscured]

23. Place: [Place obscured]

24. Remarks: [Remarks obscured]

25. Other Information: [Other Information obscured]





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